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ENVIRONMENTAL TRENDS AND CONDITIONS IN MARINE AND COASTAL WATERS AND THE MARINE RESEARCH ACT OF 1988

HEARINGS

BEFORE THE

SUBCOMMITTEE ON
ENVIRONMENTAL PROTECTION

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

ON

ENVIRONMENTAL TRENDS AND CONDITIONS IN MARINE AND COASTAL WATERS

AND

S. 2608

A BILL TO AMEND THE MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT TO PROTECT MARINE AND NEAR-SHORE COASTAL WATERS THROUGH ESTABLISHMENT OF REGIONAL MARINE RESEARCH CENTERS

APRIL 20 AND 28, 1988

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ENVIRONMENTAL TRENDS AND CONDITIONS IN MARINE AND COASTAL WATERS

WEDNESDAY, APRIL 20, 1988

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION,
Washington, DC.

The subcommittee met at 10:08 a.m. in room SD-406, Dirksen Senate Office Building, Hon. George J. Mitchell (chairman of the subcommittee) presiding.

Present: Senators Mitchell, Lautenberg, Graham, Chafee, Stafford and Pressler.

OPENING STATEMENT OF HON. GEORGE J. MITCHELL, U.S. SENATOR FROM THE STATE OF MAINE

Senator MITCHELL. Good morning, ladies and gentlemen, and welcome to today's hearing on Environmental Conditions and Trends in Marine and Coastal Waters.

This hearing is part of a series we are holding on marine protection issues. In February, we held a hearing on the implementation of the Marine Protection, Research, and Sanctuaries Act and the dumping of sewage sludge off the New Jersey coast.

Next week, we will hold a hearing on legislation I have introduced to expand and strengthen research of the marine environment. And later this year, we will hold a hearing on issues related to protection of the Chesapeake Bay.

Reports of environmental problems in marine waters have become increasingly frequent in the past few years. We have heard reports about beach closings in New Jersey; extensive pollution of Boston Harbor; a large "dead zone" in the Gulf of Mexico; closing of shellfish areas; high levels of toxins in Puget Sound, and the death of dolphins in the mid-Atlantic.

Unfortunately, there is growing evidence that these are not simply isolated problems. A major study by the Office of Technology Assessment last year concluded that the overall health of our estuaries and coastal waters is "declining or threatened".

The report states,

> In the absence of additional measures to protect our marine waters, the next few decades will witness new or continued degradation in many estuaries and coastal waters around the country.

Also last year, the National Oceanic and Atmospheric Administration published results of the first year of a national program to monitor toxic chemicals at 50 coastal and estuarine sites from Maine to Alaska. The report concludes:

> Initial results show a complex, varied picture of environmental quality around the nation's coast. A number of sites revealed relatively high levels of toxic contaminants in both bottom sediments and bottom-dwelling fish.

I was particularly concerned to learn that an otherwise "clean" reference site in Casco Bay in my home State of Maine has a level of aromatic hydrocarbons in sediment that was the fourth highest nationally.

These studies, and the various reports of specific pollution problems, are strong evidence of a serious threat to the quality of our marine and coastal waters. In considering these warnings, we need to keep several things in mind.

We need to remember that marine waters have tremendous environmental and economic value, supporting commercial and other fisheries valued at over $12 billion annually, and a large part of tourism and recreational activities in coastal areas.

We need to remember that coastal pollution problems are likely to increase as population growth and related development put increasing demands on coastal systems.

And we need to remember our experience that it is far better and far less costly to prevent pollution problems before they become large and unmanageable.

I hope that today's hearing will give us a clear picture of the seriousness and characteristics of environmental problems in coastal waters and provide the foundation for us to consider appropriate measures to respond to these problems.

We have a distinguished group of witnesses to speak to these issues, and I look forward to hearing their testimony. The first panel includes Dr. William Evans, Under Secretary for Oceans and Atmosphere of the National Oceanic and Atmospheric Administration and Mr. James Barnes, Deputy Administrator of the U.S. Environmental Protection Agency. Gentlemen, good morning. Welcome. We, as always, value your advice and testimony. We will begin with Dr. Evans.

STATEMENT OF DR. WILLIAM EVANS, UNDER SECRETARY FOR OCEANS AND ATMOSPHERE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ACCOMPANIED BY CHARLES N. EHLER, DIRECTOR, OFFICE OF OCEANOGRAPHY AND MARINE ASSESSMENT, NOAA

Dr. EVANS. Good morning, Mr. Chairman. I have submitted a full testimony, a rather detailed one, for the record, and I would like to read some summary comments into the record. This morning, I have with me Mr. Bud Ehler, who is the lead scientist for us in coastal environmental issues. I thought it would be useful to have him here when we get to the question period because he has actually planned many of our programs.

I really appreciate the opportunity to testify on NOAA's current activities related to environmental conditions and trends in the United States coastal and estaurine areas. Over half the U. S. population now lives along the coast, on only about 10 percent of the Nation's land. The national, State and local economies rely heavily on the environmental quality of estuaries and adjacent coastal waters. Estuaries are among the most productive and economically important of all natural systems, and they are also among the most heavily used and highly stressed.

Several studies of the coastal and estuarine environment have recognized at least four major problem areas which require priority treatment, and I underline priority treatment. These are:

One, loss and modification of habitat; two, toxic contamination; three, eutrophication; and four, declining economic and ecological productivity of the coastal ocean.

Estuaries provide habitat vital to many species of fish, shellfish, mammals and birds. Over 70 percent of the commercially important species of fish and shellfish are estuary dependent. These species annually contribute some $19 billion to the U. S. economy.

Since the founding of the United States, over half of the natural coastal habitat has been lost, and about 10 percent of the natural shoreline of estuaries has been modified significantly by human activity. Wetlands disappear at an estimated rate of 20,000 acres per year. Add to this not only the manmade problems, but we also have increasing numbers of natural problems that are also causing changes in our wetlands.

NOAA monitoring and assessment activities have made available information on how conditions vary among different coastal and estuarine areas, on trends over time and levels of contaminants, and on whether these trends and conditions induce harmful responses among valued marine organisms.

Representative examples of program results include: (1) Identification of sites where contaminants are most concentrated in bottom feeding fish and in sediments—high contamination levels are found in several East Coast sites—Boston Harbor, Buzzards Bay, the waters surrounding New York City, part of the Delaware Bay and the upper Chesapeake Bay. On the West Coast, in my own home town, in San Diego Bay, and in San Francisco Bay, Puget Sound and in the coastal waters off Los Angeles.

(2) In 1985, 14.2 million acres of estuarine surface waters NOAA had inventoried were classified for shellfish harvesting. The greatest percentage of approved waters is in the Northeast, Maine through Virginia, where 89 percent of the 5.5 million classified acres are unconditionally open for harvest. The greatest number of prohibited areas is in the Gulf of Mexico, where 61 percent of classified waters are restricted to some extent. Of these restricted waters, 40 percent are affected by septic systems, 30 percent by urban run-off, and 29 percent by sewage treatment plants.

Excess nutrients from sewage treatment plants and agricultural and urban run-off stimulate nuisance growth of algae, deplete the oxygen in the water column, kill fish and shellfish and cause shifts of populations of animals. About one-third of the Nation's estuaries have eutrophication problems at some time during the year, and extensive areas of low-dissolved oxygen exist seasonally off the mid-Atlantic states and on the continental shelf off Louisiana.

In addition to the tremendous losses to fisheries I mentioned a few minutes ago, environmental degradation in coastal areas threatens many other uses of those areas. For example, each year about $7 billion in public funds are used at all levels of government to provide facilities for and access to marine recreation.

Effective response to these problems requires a concerted cooperative effort by all levels of government—Federal, State and local. NOAA place a major role at all of these levels. We provide scientific information to environmental regulators and resource managers. We assess and evaluate the scale and scope of the environmental degradation in the coastal ocean. We provide scientific advice and support in real time to agencies involved in response to spills of oil and hazardous materials.

We manage interagency coordination and planning to more effectively and efficiently respond to coastal and estuarine management needs and to effectively manage Federal marine environmental research, development and monitoring. We conduct and support research on environmental processes and studies of various elements of ocean management such as fates and effects of pollutants.

NOAA has a long-standing and productive working relationship with the Environmental Protection Agency, dealing with many specific problems in the coastal ocean. For example, since the early 1970s, we have worked with EPA to characterize alternative ocean waste disposal sites, and since 1982, we have worked with EPA to provide scientific information used in cleaning up of Superfund sites in coastal areas, where over 40 percent of the sites on EPA's national priorities list are found.

Mr. Chairman, there is ample evidence that many, many serious ocean and coastal environmental problems require a high level of attention. NOAA has underway many programs which address aspects of these problems and is doing its best to respond to the needs of the government at all levels for timely and high-quality scientific information to support efforts to prevent or minimize environmental degradation, restore areas where damage does occur and react effectively to oil and hazardous materials spills. We are not content with just using today's solutions.

We are interested in continuing research so that we can improve the way that we can respond to the very serious problems that we are facing today. This concludes my prepared remarks. Thank you very much for inviting us to be with you today. I will be pleased, along with Mr. Ehler, to respond to any questions that you may have. Thank you very much, sir.

Senator **Mitchell**. Thank you, Dr. Evans.

Before hearing from Mr. Barnes, I would like to recognize the presence of Senator Graham, former Governor of Florida, who is a distinguished and very valuable member of this Subcommittee and Committee. Senator Graham, do you wish to make an opening statement?

Senator **Graham**. Thank you, Mr. Chairman. I have no opening statement.

Senator **Mitchell**. Thank you.

Then we will hear from Mr. Barnes. Welcome, as always. We look forward to hearing from you.

STATEMENT OF A. JAMES BARNES, DEPUTY ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY TUDOR DAVIES, DIRECTOR, OFFICE OF MARINE AND ESTUARINE PROTECTION

Mr. **Barnes**. Thank you very much, Mr. Chairman. We are delighted that you have included the Environmental Protection Agency in your hearing here this morning. I just want to introduce Tudor Davies, who is the Director of our Marine and Estuarine Protection Office who is accompanying me here this morning.

Just as Dr. Evans did, I would like to submit my testimony for the record and simply highlight a small number of points out of that testimony. I suspect that there is going to be a great deal of commonality of the things that you are going to hear from witnesses here today.

In essence, we have three fairly simple points that we want to make: One, that the environmental problems in coastal ecosystems are linked to increased loadings of various pollutants that result from population growth and economic growth. In essence, we are dealing with the same kind of products of human activity and human waste that you deal with and we deal with across the spectrum of environmental problems, but we are seeing here an area where we really have to get some dramatic reductions in some of those pollutants.

Secondly, we are going to see that the sources of those increased loadings are located not only along the coast, but, in many cases, hundreds of miles inland, as well; and third, as Dr. Evans indicated, that the protection of coastal areas is going to demand a cooperative involvement of Federal, State and local governments, private businesses, environmental groups and individual citizens alike.

The environmental challenge we face in protecting coastal ecosystems is especially serious because the resource is so valuable, as both you and Dr. Evans have noted. Meeting that challenge is going to be especially difficult because of the nature of the problem: Estuaries, because of their physical characteristics, tend to trap and concentrate incoming pollutants, allowing them to build up over time so that the heavy metals, organic chemicals, pesticides, pathogens, nitrogen and phosphorus are collecting in the coastal waterways in greater amounts than ever before. It is not because we are less concerned about environmental quality than we were 20 or 30 years ago, but because there are many more of us now involved in much more economic activity along the coast.

As you had noted, Mr. Chairman, the population of the country is increasingly concentrating along the coasts. I think this brings some meaning to Herman Melville's comment about a century ago that Americans will have a need to get as close to the water as they can without falling in. Our nation now is finding that population density is about five times greater in coastal counties than it is in the rest of the country, to the extent that we shortly expect to see about 75 percent of the U. S. population living within 50 miles of the coast.

This demographic concentration bodes ill for coastal ecosystems, because to accommodate this population growth, we are filling in wetlands; we are building roads across marshes; we are diverting fresh water flows and thus destroying the natural habitat and causing declines in the fisheries and shell fisheries.

Increasingly, we are locating, then, municipal treatment plants and industrial facilities in coastal areas that are discharging effluents into estuaries and coastal waters. The other products of civilization from combined sewer overflows, shipping and recreation are also coming into these areas. Given the projected population and economic growth along our coastlines, the potential for these total pollutant loadings is for them to increase to the great detriment of our natural ecosystems.

The environmental problems that are facing coastal ecosystems are compounded by the fact that additional pollutant loadings flow into estuaries from far upstream. For example, in the Chesapeake Bay, that you indicated you will be focusing on in a week or so, you see the products of agriculture and urban and suburban life make their way into that Bay starting as far away as the Mohawk Valley of New York, the eastern slopes of the Appalachian Mountains, or the inland counties of North Carolina.

But if you were to look at a map, any of the drainage basins of other estuaries would be equally striking in terms of the range they cover. The whole U. S. bread basket from the western slopes of the Appalachian to the eastern slopes of the Rockies, for example, drains into the Gulf of Mexico. So it is clear that the sources of the environmental problems we are facing, in many cases, are going to be found hundreds of miles inland, and the solutions, in some cases, are going to have to be found there, as well.

Finally, I would like to just briefly note some of the activities involving coastal waterbodies that are covered by current EPA programs. We have got programs underway to protect coastal waters on all three coasts and the Great Lakes, but I think just as important as the geographical breadth of our programs is their content.

One, we are committed to providing basin-wide approaches to solving coastal problems, and we have to solve those or attack those problems at their source, even if the source is miles upstream.

Second, we are committed to using all of the available regulatory tools and clean-up techniques that you have provided us through our statutory authorities, be it the NPDES authorities under the Clean Water Act or the National Municipal Policy which we are using to try to improve environmental performance from sewage treatment plants.

Third, we are committed to collaborative efforts involving all relevant government entities, public interest and user groups and the private sector. We have been very pleased, as Dr. Evans indicated, at the very close working relationship we have developed with NOAA as it relates to our joint interests along the coast doing joint studies together; working on assessments together; working to implement some of the recent legislative directives that you have given us.

But we also see that we are going to need more State government efforts like Maryland's program to limit development within 1,000 feet of the shorelines and New Jersey's 14-point plan to deal with coastal waterways.

We are going to need more public interest group efforts and intensification of those, like those carried out by Save the Bay in Rhode Island, and we are also going to need much more awareness and action by individual citizens that the herbicides and insecticides that are sprayed on lawns in Brattleboro, Vermont or the animal wastes washed off ranges near Bismarck, North Dakota or oil that leaks into the streets in Twin Falls, Idaho all have the potential to contribute to pollutant loadings in coastal waters and to damage those valuable resources.

Finally, really, in connection with this point, I would like to call the Committee's attention to a book that was recently put out by a consortium of organizations that includes the State of Maryland, University of Maryland, the Chesapeake Bay Foundation, The Citizens Program for Chesapeake Bay and EPA called "The Bay Book", which lays out for individuals, I think in a very attractive format, a number of the things that they can do to help assist the health of the Chesapeake Bay.

I think in conclusion, it is critical that we capture the interest and harness the energies of all of the people who contribute to water quality problems in the coastal and estuary areas. I think it is absolutely essential that we succeed in our national efforts to protect these enormously valuable natural resources.

Thank you, Mr. Chairman. we would be pleased to respond to any questions that you might have.

Senator **Mitchell**. Thank you, Mr. Barnes.

In accordance with the Committee's rules, we will conduct the questioning in the order of appearance by Senators and limit it to five minutes for each round. We will continue for as many rounds as Senators desire.

You are both familiar with the report by the Office of Technology Assessment, and I would like to read to you two key conclusions and ask whether or not you agree with those conclusions. The OTA report included this statement: Estuaries and coastal waters have exhibited a variety of adverse impacts, and their overall health is declining or threatened.

Do you two gentlemen agree or disagree with that assessment?

Dr. **Evans**. Mr. Chairman, NOAA agrees with the general findings about the condition of the Nation's estuaries. The pollution problem in our near shore and coastal waters is the most important and perhaps the most critical environmental quality problem that faces the Nation.

You may be aware that in the Global 2000 report that came out when we talked about what the problems were going to be in the year 2000—whether it was the availability of food, fuel, and a number of other things—the most critical problem that was outlined in that report was the availability of potable water by the year 2000. Water quality was considered by that report to be of very vital importance to this country, and it still is.

So in that regard, we believe that this is very important, and in fact NOAA through the National Marine Fisheries Service, and through our National Status and Trends Program and National Estuarine Inventory, provided a lot of the information and the data that went into that report.

Senator **Mitchell**. Mr. Barnes, do you agree?

Mr. **Barnes**. We would share that assessment that OTA has of our current situation.

Senator **Mitchell**. OTA then went on to say, and I quote again,

> In the absence of additional measures to protect marine waters, the next few decades will witness new or continued degradation in many estuaries and coastal waters around the country.

Do you agree or disagree with that conclusion, Dr. Evans?

Dr. **Evans**. Mr. Chairman, I think that in general, the conclusion is that if we do not continue the programs that we have now and, in some cases, intensify our monitoring and make some of the programs that we have in place more effective than they are right now, then that, indeed, will be the case. In that regard, yes, I do agree.

Senator **Mitchell**. Mr. Barnes?

Mr. **Barnes**. I would agree with Dr. Evans' assessment there. In some cases, I think, intensification of current approaches that we have embarked on and the use of current authorities will help prevent that adverse result that you referred to.

Senator **Mitchell**. That, of course, leads to my principal concern and question. If we all agree that estuaries and coastal waters are in a situation where their overall health is declining or threatened in the absence of additional measures, continued degradation will occur.

I want to ask you about some of the proposals by the Administration that impact on this. I recognize that you gentlemen are part of the administration, and we expect you to represent the administration, but as you know, the administration has proposed to cut funding for construction of sewage treatment plants by almost half; will not request funds to start up the grant assistance program to help States deal with non-point sources of pollution, which are a major problem for estuaries.

I would like to ask you, are you not concerned, on the one hand, agreeing that the situation is serious and declining and that additional measures or, as you put it, intensification are necessary, and yet be proposing significant reductions in existing programs and/or not being willing to go forward with the non-point pollution program? Mr. Barnes?

Mr. **Barnes**. Yes, Mr. Chairman. First, with respect to the municipal treatment area, one, we would agree with, I think, you and OTA that they are a key part of trying to protect or enhance estuary areas and that we are going to need strong efforts in that area. I think both the Administration and Congress have agreed on a proposed approach to essentially eventually turning the funding of that over to the States, and we have some differences at the pace at which that should take place and how much out of the current limited Federal budget we should put up during the current year.

With respect to the non-point sources, again, we think that, as our full testimony indicates, it is a very key piece to addressing coastal and estuary problems. I would point out a couple of things. One, for example, within the context of our Chesapeake Bay program, grants for non-point source efforts are the major use of those monies.

Second, in structuring the new construction grants program, we have tried to provide flexibility there so that States, including coastal States, would be able to use those monies to make loans to people to deal with non-point source pollution, that where those are a large part of the water quality problems identified in a particular State, that the monies that are available under the Clean Water Act should be available for those purposes.

Senator **Mitchell**. My time is up. I want to defer to the other Senators, but I will get back to this with you on the next round. Senator Graham?

Senator **Graham**. Thank you, Mr. Chairman.

Could you outline, Mr. Evans or Mr. Barnes, what you would recommend to be our national goals by the year 2000 in terms of the management of coastal, interior bay, and estuarine areas and what quantification of measurement of attainment of those goals would you recommend?

Dr. **Evans**. Senator, I think that is an excellent question, and one that we certainly have been looking at in NOAA. We are starting right now. As you know, we have a new Secretary of Commerce, C. William Verity, and we have been discussing with him the fact that we need to, within NOAA, change our focus a little bit in terms of looking at this as a major problem.

One of the things we feel that is going to be necessary is one of the things that Mr. Barnes said earlier, and that is developing a much better networking with the States and working more closely with the States to develop programs with them that will find ways of mitigating some of these problems and stop some of the things that we can stop. There are a number of things that, unfortunately, have been on-going for a long time. The developments are there. It is not something that we are going to be able to turn back, so we are going to have to look in terms of the area of mitigation.

I know you have very serious concerns in your own State. About four months ago, when I was the Director of the National Marine Fisheries Service, I had the opportunity to be in the State of Florida and meet with the people in your State government who are interested in that more in conjunction with the Manatee problem than anything else. But I think a number of the programs that are going on there and the concerns that they have in terms of the very rapid coastal and waterway expansion that is going on there—which I know is of major concern—show that we need to have and they agree, a much closer relationship between the State programs and the Federal programs to address those issues, not for just now, but a long-range plan.

One of the things that we will be looking at within NOAA is coming up with what directions should we go, and that is one of the questions I am asking the line offices within NOAA: What direction should we be going, not only in the next five years, but in the next ten years.

Senator **Graham**. Excuse me, but cooperation at an intergovernmental level is a process. What I am interested in is a clear statement of what our destination is to which that process will then be applied. What should we be trying to accomplish in terms of the management of our bay and estuarine systems, and what will be the standards from a quantitative standpoint where quantification is possible that will give us some reassurance that we have attained our destination or are closing in on it?

Mr. **Barnes**. Senator, we would like to suggest an approach from the EPA perspective, which is, I think, similar to what we are following in the Chesapeake Bay and a number of the other national estuary programs where you gather people together: you take stock of where that particular estuary is; you identify what would seem to be some of the major problems in that area; you set some goals for yourself.

For example, in the Chesapeake Bay, one of the goals that has been set by the States and EPA is a 40-percent reduction in nutrients going in the Chesapeake Bay at that point. Then I think we can start to look for some indicators or surrogates, for example, of being able to reopen shellfishing in areas, or seeing an increase in certain fishery stocks.

I think that to a certain extent, we need to look at that on an estuary-by-estuary basis. I think that maybe, as Senator Mitchell suggested in his opening comments, there are some differences between different estuary areas; what are the predominant problems, and what have been some of the losses? But at a minimum, as an overall goal, we have got to arrest the deterioration of these estuary areas. We have got to try to arrest the loss of wetland areas moving toward no net loss in that area, and then I think we have got to set our sights positively beyond that to see whether we can't try to recoup some of the losses that we have sustained in this area, things that have given great benefit to the lives of our forebearers and which I think all of us would like to see our children enjoy.

Senator **Mitchell**. Thank you, Senator Graham.

Senator Pressler.

Senator **Pressler**. Mr. Chairman, I do not have any questions except to compliment this panel and say that although none of these areas being discussed are in South Dakota, we do have great problems with preserving our lakes and related problems. I am supportive of these efforts, because we are one country environmentally, and I compliment the witnesses and the Chairman for holding this hearing.

Senator **Mitchell**. Thank you, Senator Pressler. I am pleased to be joined now by the distinguished former Chairman of the Full Committee and a man who I have said many times is more responsible than any other single individual for protecting the health and environment of our Nation and our Nation's people in this decade, Senator Stafford.

Senator **Stafford**. Thank you very much, Mr. Chairman, for the very gracious words. I have no opening statement, and neither do I have any questions at this point. But it is a very important and interesting subject, and I have come here to learn.

Senator **Mitchell**. All right.

Senator **Pressler**. You have just decided to run for reelection?

Senator **Mitchell**. If he did, he would win handily, I can assure you.

Let me, then, pursue just briefly the question I asked earlier to which Mr. Barnes responded, and I will ask Dr. Evans how you reconcile your assessment of the current situation as one in which the quality of our coastal waters is declining and threatened, and that additional measures, intensification of existing measures, must be taken with the Administration's budget position which seeks to reduce existing programs or not to proceed with existing programs in a wide range of areas.

I mentioned just a couple of them, but in fact, within your jurisdiction, you have the national status and trends program, which has generated important data concerning the presence of toxic contaminants in sediment and fish. The President's budget doesn't provide funding for collection of this field data in 1989. Will that break the continuity of data and undermine the concept of reporting trends?

That and the other specific budget recommendations that are referred to in Mr. Barnes' question at least create a predicate for raising a question as to the Administration's view. On the one hand, it is serious; it is declining; we need to do more, what we hear in this Committee, but in the budget, "Let's not fund what we are doing; let's cut existing programs; let's reduce activities in this area."

Do you reconcile that? Can you reconcile that?

Dr. EVANS. Well, as you say, and as you pointed out, we do represent the Administration. Within the restrictions of the budget as it is presented—as the President has presented his budget request for fiscal year 1989—there have been some recommendations for reductions in certain areas which are going to demand that in order to meet those requirements, and we will meet our statutory requirements in those areas, that we change our focus, which was a word that I used before.

As I have said in other hearings, I have discussed this issue in terms of where we are going in NOAA and how we are concentrating our efforts and what we are going to be able to do with the funds that are going to be made available to us in the time of fiscal constraint.

One of the things you mentioned, for example, is the Status and Trends program. That program has been going on for a number of years now and has been extremely valuable. It provided the basis and the background for many of the statements that we have made here today. That program has a lot of data, and we are going to concentrate on a number of those things which are not necessarily the expensive portion of it, which is getting into the field and using boats to get out and continue some of the programs of collecting. We have a lot of data now.

One of the things we are going to do during 1988 and 1989 is to concentrate on those data, and one of the things we possibly will be recommending is that we will still continue to look at those but in more of a monitoring mode rather than in a detailed assessment mode, as we have in the past.

There is a time to continue to collect data and collect data and collect data, and then there is a time to sit back and reflect on that. Also, we are going to have to use the satellite surveillance which is available and which has become better and better in recent years.

We just recently found out, for instance—by monitoring some of the information that we have been getting from our satellites—

that both our polar orbiting satellites, as well as the geostationary satellites have provided us with extremely valuable information. They have told us something about what is happening with the very disastrous or potentially disastrous problem with Red Tide, which occurred off North Carolina, and was a situation that was not suspected. We now know what some of the causes of that problem are. We are going to be able to monitor that.

Now, that is a natural kind of problem, but it still is a coastal environmental quality problem. Hopefully, we are going to be able to use a number of these things to look at river effluents. We are beginning to understand with some of the programs that Mr. Ehler has been developing—we are beginning to come up with programs that are much more efficient in utilizing the resources that we have. We are going to have to continue to concentrate on those if we are going to be able to accomplish our mission within the fiscal constraints that we do have within the Administration.

Senator **MITCHELL**. Thank you very much, doctor.

Senator Graham, do you have any further questions of this panel?

Senator **GRAHAM**. Yes, Mr. Chairman. I would like to pursue an issue which I think is linked to the question you have been asking, and that is goal setting. If you don't know where you want to go, then you can wander off on any path and it will get you there. It seems to me that in a national program that you would go through a series of steps, one of which would be to identify those areas which transcend parochial importance and have national significance.

I would assume that that is the underlying premise behind the selection of the various estuarine areas of national importance. Once those areas have been selected, then second would be to establish an estuary-specific set of goals defined as Mr. Evans was defining them in terms of performance, specific consequences, and then third, an array of national initiatives which might be totally Federal or collaborative with other units of government in order to achieve those goals.

Once you have the goals, then the specific kinds of programs that the Chairman has been outlining come into rather stark relief in their inconsistency in terms of whether they will contribute to achieving the goals. If those are three rational steps, designation of estuarine areas of national significance; two, the establishment of goals on a bay-specific basis; and then third, the initiatives that will be necessary to achieve those goals, what are the criteria that are being used?

I understand there are six remaining estuarine areas to be designated. What are the criteria that are being used to determine the national importance of those areas that have or will be designated?

Mr. **BARNES**. Senator, I think I will turn to Tudor Davies, who oversees that program. Congress had indicated, had given us a list of six specifically to look at. In addition, we have received nominations from Governors of a number of other States.

Mr. **DAVIES**. Yes. You gave us an additional six estuaries to consider in addition to the six that we had been working on.

Senator **STAFFORD**. Mr. Chairman, I suggest the witness bring the mike up a little closer so we can all hear.

Mr. **Davies**. We have given the States an opportunity to prepare a nomination, and that nomination will show whether there are significant problems; whether there is, in fact, a likelihood of success and a will to implement a management plan for that estuary.

We are going forward with review of those nominations, and as Mr. Barnes said, we have some additional estuaries which were not named by the Congress that have shown evidence of wanting to be in the program. This includes a governor's nomination and a significant local effort and evidence of working with other Federal agencies to say that there are problems, and there is a potential to mitigate those problems.

We will be moving forward in that process. But we are using the Congressional list initially.

Mr. **Barnes**. Can I add something?

Senator **Graham**. Go ahead.

Mr. **Barnes**. Some of the approaches that we have evolved and some of the information we are developing we can make available to other coastal areas, even though they are not formally in the program. I believe that this kind of technology transfer, training, that sort of assistance, ought to be a key part of what EPA is doing, whether or not a particular local community is in the formal National Estuary Program.

Senator **Graham**. The statement just made, again, concerns me because it seems to be an inductive rather than a deductive process. It would seem to me that if we can embark on a national program that the national government ought to have some criteria as to what are those characteristics that distinguish between water bodies that are of national importance as opposed to those that are of parochial importance in the same way that we have to do in a whole array of other social and economic programs.

Does the agency that is going to be making this designation have such a set of national criteria against which locally nominated projects will be evaluated?

Mr. **Davies**. Yes, sir, we do.

Senator **Graham**. What are those others?

Mr. **Davies**. Those criteria are that we will be looking at the susceptibility of that estuary to damage; that we will be losing natural resources that have significance in the coastal environment, either as breeding areas or are very important commercial stocks.

We have looked at susceptibility in terms of susceptibility to toxic substances affecting the ecosystem. We have looked at susceptibility to loss of wetlands. We have looked at susceptibility to the impact of additional nutrients coming in that would produce problems with oxygen demand in the system; that is, low oxygen, and then the loss of natural resources.

We have categorized with NOAA the 90 plus estuaries around the country, the major estuaries, in terms of this susceptibility analysis, and we will be using that analysis in our designation process.

There is enough information about damage available at this point in time that we understand that we have significant problems and the potential, because of development, for those problems to become even more difficult to mitigate in the near future.

Senator **Graham**. Could I just pursue one more question?

Senator MITCHELL. Go right ahead.

Senator GRAHAM. Thank you, Mr. Chairman. Staying on that same first tier, which is the designation, are you going to try to have a set of designated estuaries which represent diversity in terms of their climate, their size, other conditions?

Mr. DAVIES. Yes, sir. In the analysis of the twelve estauries that were named by the Congress, we have looked at those in terms of geographic diversity; whether they fit into different biogeographic provinces; whether we have a range of problems so that we can demonstrate solutions that would have national importance and that these estuaries, in fact, have significant national problems we should be addressing.

We have done that with NOAA, but we are also looking for commitment of the State and the local citizens to work with us so that we can move this program towards implementation and not merely have a plan developed as to how to mitigate a problem. We are looking initially for commitment to work and to fund some of the activities that will be required.

Senator MITCHELL. Thank you, Senator Graham.

Senator Lautenberg?

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. Thank you, Mr. Chairman. I have just a brief statement and a couple of quick questions. The summer of 1987 is going to be long remembered by those of us in New Jersey. Officials closed the beaches over 100 times because the water wasn't safe to swim in. Dolphins died by the hundreds from mysterious causes and were washed ashore in New Jersey and other east coast beaches. A garbage slick that included hospital wastes and syringes polluted beaches in New Jersey and Delaware.

Unfortunately, these events are part of a pattern of degradation of coastal waters all over the country. Last year, OTA concluded that without additional efforts, degradation of our marine environment around the country will continue. This degradation will have significant consequences for our society. Fisheries will decline in their catch; recreational opportunities will diminish; and business, dependent on coastal tourism, is obviously going to suffer.

The Congress has responded to this crisis. We passed the Water Quality Act of 1987 to provide funding for sewage treatment facilities and to establish programs to address non-point source pollution, toxic hot spots and stormwater discharges, and we prohibited the disposal of plastics and other garbage from vessels.

Today's hearing will allow us the opportunity to explore what actions that each of us, Federal, State, and local governments, businesses and private citizens, must take to restore and maintain the health of our marine waters.

Mr. Chairman, I thank you for calling this hearing.

It is very important that we pursue the clean-up of our estuaries and our oceans. I would like to just address a question to Mr. Evans. That is, the cuts that have been proposed for Coastal Zone Management, Sea Grant, Fisheries Research, Habitat Protection, and the Status and Trends programs, those cuts, I think it is fair to say, will have a significant negative impact on your ability to address the marine pollution problems, will they not?

Does it make sense to reduce or eliminate these programs when your own marine pollution monitoring is showing significant problems in coastal areas?

Dr. **Evans**. Senator, we have had to make some rather drastic cuts across the board in a lot of programs. I think that if you look at the overall budget, although there are decreases in some of those programs, we have moved some of them up into higher priority programs and have tried to adjust the budget accordingly so that we can still continue to address those things which I said here in my testimony and which I firmly believe myself to be major, major problems.

One of the things that I have said around town to a number of groups that I have talked to, having just recently come on board as the Administrator of NOAA, is that I am, at the present time, trying to take a very close look at all of the priorities that were set within NOAA in terms of the kinds of programs that we have. I am now taking the opportunity to do that, as I have promised the Appropriations Committee I would, and I have discussed that also with Secretary Verity.

I realize that a number of these programs of importance have been listed as being cut down and cut back in terms of funding, and what we are trying to do is to look internally within the funding that we have available how we can refocus our energies just as we did with the dolphin problem last year, which was, frankly, a thing that we did not have in the budget. But it became something that was of national importance and, therefore, we focused a lot of the energies that we had in other programs to address that issue as it came up.

That is something that, in the current fiscal climate, we are going to have to continue to do. I know that in many cases, that may not be the best answer, but I think that one of the things we are going to be able to do is to come up with some programs where we are going to have to get more bang out of the buck that we have within NOAA. I think that with some reorganization and some refocusing we are going to be able to do that.

Senator **Lautenberg**. Dr. Evans, I didn't know your assignment was that of a magician. It is going to be very hard to get a loud enough bang out of the measly bucks that we are talking about to solve the problem.

Do you agree these are important programs? We look at Coastal Zone Management, Sea Grant, Fisheries Research; they are important programs.

Dr. **Evans**. Yes, sir. They are extremely important.

Senator **Lautenberg**. Well, it is pretty obvious that "The car don't run without gasoline," and the programs don't get taken care of without funding. I recognize that you are in a tough spot. You have got to deal with, "Do more with less," but I would just like to know whether or not you think that you can manage these programs effectively with diminished resources or whether, in some way, that it doesn't impair your ability, our ability as a country, to deal with the problems of our oceans and marine bodies.

Dr. EVANS. We are internally addressing that issue with a great deal of vigor and appreciate your concern, and your concern is actually our concern, also.

Senator LAUTENBERG. I guess that I can't get you to say that you could do it better if you had more resources. We will watch with interest to see how your magic works, Dr. Evans.

Thank you very much, Mr. Chairman.

Senator MITCHELL. Thank you very much, Senator Lautenberg. Thank you gentlemen, very much. In accordance with our practices, the record will remain open for any Senator who wishes to submit questions in writing. If you do receive them, I ask that you respond consistent with your own time demands. Thank you very much.

Dr. EVANS. Thank you, Senator.

Senator MITCHELL. The next panel will include Mr. Robert Niblock, Director of the Oceans and Environment Program of the Congressional Office of Technology Assessment; Mr. Cliff Curtis, the Executive Director of the Oceanic Society, and Dr. Sarah Taylor, Executive Director of the Chesapeake Bay Critical Area Commission, State of Maryland, Department of Natural Resources. Dr. Taylor will be representing the Coastal States Organization.

Senator MITCHELL. Good morning, Dr. Taylor and gentlemen. We look forward to hearing from you. You are familiar with the Committee's rules and procedures. Your written statements will be placed in the record in full. We ask that you limit your oral remarks to a five-minute summary of your written statement, providing us with what you believe to be the most important elements of that testimony.

We will begin with Mr. Niblock.

STATEMENT OF ROBERT NIBLOCK, DIRECTOR, OCEANS AND ENVIRONMENT PROGRAM, OFFICE OF TECHNOLOGY ASSESSMENT

Mr. NIBLOCK. Thank you, Mr. Chairman, for the opportunity to appear before your Committee today. I, like the other earlier witnesses, have a full written statement which I would like to submit for the record and briefly summarize those comments.

Since there have been several references to the OTA report, I think it is not necessary for me to go again into the findings of that report. So with your permission, I will just talk for a moment about some of the proposals or some of the ideas that we have developed on measures that might be taken to deal, in the broad sense of the word, with the coastal and estuary problem.

There are two statutes, the Clean Water Act and the Marine Protection Research and Sanctuaries Act, that form the basis of most Federal regulatory efforts to combat marine pollution. The Marine Sanctuaries Act regulates dumping in coastal and open ocean waters, while the Clean Water Act has jurisdiction over all pipeline discharges, dumping in estuaries and run-off.

These two statutes have helped reduce the amount of pollutants entering marine waters, the Federal government's contribution of over $44 billion to construct and upgrade municipal sewage plants being a notable example. However, even this level of investment has not been sufficient to actually protect some estuaries and coastal waters from degradation.

Even with total compliance, which is unlikely, existing Clean Water Act regulations will not be sufficient to maintain or improve the health of all estuaries and coastal waters. This is because current Clean Water Act programs do not address all important toxic pollutants and sources of these pollutants. Current Clean Water Act programs do not adequately address run-off. Federal resources for sewage treatment are declining, and the ability of the States and the communities to fill this breach is uncertain.

Pipeline discharges and urban run-off will increase as population and industrial development expand into coastal areas. So in this situation, what does one do? There are three different but not necessarily exclusive measures that might help to maintain or improve the health of our estuaries and coastal waters. One is just a straightforward improvement of the current Clean Water Act system by increasing enforcement, completing the promulgation of overdue regulations and expanding controls to cover more toxic pollutants and industrial sources.

A second step, and again, these are not mutually exclusive, is to begin moving disposal activities out of the estuaries and the coastal waters. Such a strategy will be difficult, however, because of the technical difficulties of moving certain pollutants out of there and the conflicts that will occur with laws and policies regarding disposal on land or in the open ocean.

The third strategy involves moving towards environmental planning on a drainage basin or a water body basis, which was alluded to by the earlier witnesses. It also involves considering the full range of degrading activities, disposal or otherwise.

The Federal government and some States have already recognized this idea in some areas and have developed management programs with an environmental planning orientation, the Chesapeake Bay program and the Puget Sound Water Quality Authority being two such examples.

Other Federal activities and mechanisms that address broader policy questions include the National Estuary program, which was authorized under the Water Quality Act of 1987, the Coastal Zone Management Act, and EPA's initiative on near coastal waters.

The intent in the National Estuary program and the Near Coastal Waters initiative is to stimulate and provide models for State planning. Most recently, Senator Mitchell introduced a bill to establish ten regional research centers around the country. Thus, sufficient legislative authority to develop site-specific management where needed either exists or is under active consideration.

While site-specific integrated planning appears promising, very promising, programs based on such an approach do not exist for most estuaries and coastal waters. Moreover, some potentially critical links seem to be missing: An overall guiding philosophy specifically oriented to estuaries and coastal waters and a system for deciding when and how to provide additional management.

The Federal Government could expand its role in facilitating the systematic development of site-specific management plans. In their current forms, neither the National Estuary program, which has limited ability to systematically address marine pollution problems, nor the Coastal Zone Management program can provide these services.

Whatever reform our response takes, success will depend on involving the public and getting the many responsible agencies to cooperate. It will also require local and State regulators to make difficult decisions about land use issues and coastal development practices.

Moreover, without greatly increased efforts to reduce and recycle waste, continued protection in any environment is going to be difficult at best.

I thank you. I would be happy to respond to any questions.

Senator MITCHELL. Thank you, Mr. Niblock.

Mr. Curtis.

STATEMENT OF CLIFTON CURTIS, EXECUTIVE DIRECTOR, OCEANIC SOCIETY

Mr. CURTIS. Thank you, Chairman Mitchell. I am Clifton Curtis, President of the Oceanic Society. I appreciate the opportunity to testify today at this hearing as your Subcommittee examines the seriousness and extent of threats to the environmental quality of marine and near-coastal waters.

The oceans, though vast and covering over 70 percent of our planet, are a vulnerable, complex environment. We count on the oceans for oxygen, moisture, weather patterns, food, trade, recreation and commerce. Without healthy oceans, life as we know it would end.

Yet as you, Chairman Mitchell, and others have already noted, there is substantial and growing evidence which shows that ocean and coastal resources are being mismanaged and abused. Far too often, decisions involving these resources are made to benefit narrow, short-range special interests.

They are made with disregard for or inadequate understanding of potential adverse long-term consequences. In recent years, there has been an alarming increase in the degradation of near coastal waters. Much less is known about the deeper ocean, but there are signs of damage there, too.

In my prepared testimony, I briefly mention several governmental and non-governmental reports that convey in detail both the severity and magnitude of the problems facing our marine and coastal waters.

Internationally, the recent report prepared by the World Commission on Environment and Development, titled "Our Common Future", states in part that, "—sustainable development on our planet, if not survival itself, depends on significant advances in the management of the oceans."

Other recent national reports, such as those prepared by Save the Bay, from Narragansett, by OTA, which Dr. Niblock has mentioned, by EPA, NOAA, and by the Coast Alliance reinforce the need for action now.

While the principal focus of all these reports is on estuarine and near coastal waters, our inadequate understanding of ocean processes and impacts of human activities in the deeper ocean are cause for caution and concern, as well.

In important respects, we can use the estuaries as mesocosms, or experimental subsets, of the open ocean. When we extrapolate the increasing stresses in estuaries to the ocean, it is only a function of time before the deeper ocean exhibits the high level of stress and damage that now exists in estuarine and near-shore areas.

In my written testimony, I discuss the major sources of marine and coastal pollution. Absent a comprehensive approach to managing waste inputs, it is essential that steps be taken to ensure that each pollutant source be dealt with. Numerous independent indicators of marine environmental quality point to deteriorating conditions in the coastal marine ecosystems of this country. Those indicators are discussed in my written statement along with a brief review of the special situations that exist from the Gulf of Maine to the Chesapeake Bay to the Gulf of Mexico, San Francisco Bay and Puget Sound, among others.

In the concluding section of the written statement, I have listed several recommended actions that are needed to redress the current situation. While that list is, by no means, comprehensive, it highlights several actions that need to be taken by Congress, other decision-makers and/or the public, including:

(1) A hierarchial approach to hazardous waste management, with source reduction as the primary goal at the top of that hierarchy;

(2) An ecosystem approach to managing ocean and coastal resources that addresses all activities impacting on an identified ecosystem;

(3) The need for much more rigorous enforcement of existing laws;

(4) The need for amendments to some existing laws such as the Ocean Dumping Act, for which a date certain needs to be set for phasing out ocean dumping of sewage sludge and industrial waste;

(5) The need for some new laws to ensure effective regulation of activities that may contribute to degradation of the marine environment. Two examples of issues where new laws are needed are oil spill liability and compensation, and deep sea bed mining in our Exclusive Economic Zone.

As for oil spill liability, the Oceanic Society and others within the environmental community would greatly appreciate your help, Senator Mitchell, by reintroducing the bill you introduced in the last Congress and by helping to move that bill through the Congress to final enactment. We would support you in those efforts;

(6) The need for a commitment to guaranteeing adequate and effective funding at the Federal level for marine and near coastal programs. In this regard, we whole-heartedly endorse the concerns raised by Senator Lautenberg, you and others in asking questions of the earlier panel about funding levels;

(7) We urge development of a pilot "Citizens Coastal Toxics Hotline; and I'd like to mention one other recommendation, Senator Mitchell;

(8) Special efforts are needed to target research to regional needs, and in this regard, my organization supports the overall thrust of your proposed Marine Research Act of 1988 that you will be examining more closely on April 28th.

These and other recommendations in my prepared testimony, if undertaken, would provide an invaluable assist in our collective efforts to protect, conserve and restore our vital marine resources. The Oceanic Society looks forward to working with you, other Members, and the staff of your Subcommitte in achieving that objective. Thank you.

Senator MITCHELL. Thank you very much, Mr. Curtis.

Dr. Taylor, welcome. We look forward to hearing from you.

STATEMENT OF DR. SARAH J. TAYLOR, EXECUTIVE DIRECTOR, CHESAPEAKE BAY CRITICAL AREA COMMISSION, STATE OF MARYLAND DEPARTMENT OF NATURAL RESOURCE, REPRESENTING THE COASTAL STATES ORGANIZATION

Dr. TAYLOR. Thank you very much, Senator. I am Dr. Sarah Taylor, and I am Vice Chairman of the Coastal States Organization, which represents 35 territories, commonwealths and States in this nation. I am also the Executive Director of the Chesapeake Bay Critical Area Commission, which was referred to by EPA as the land use control agency in the State of Maryland that has put forth criteria to guide development along the 1,000 foot strip around Maryland's part of the Chesapeake Bay.

The Coastal States Organization conducted a regional survey of a number of its key members, and from that survey, four problems were brought to light as being the most significant problems affecting the coastal waters of the United States. These include: Toxins in water and in the sediment, Senator Mitchell, as you pointed out earlier in your testimony; non-point source impacts, particularly from agriculture and from suburban and urban areas; declining fish and shellfish and ocean pollution.

You heard this morning from the Federal agencies that there is a good bit of cooperation between them and that they need commitment on the part of the States with respect to tackling the ocean pollution and coastal pollution problems that we face. Coastal States Organization contends that commitment is there.

As you know, Senator Mitchell, it is very disturbing for you, from Maine, to have lost several hundred million dollars because the finfish population has been cut in half. And you know that the efforts that the State of Maine is making to begin to ascertain what these pollution inputs are from land use is very significant. But the State continues to need and continues to want to rely upon EPA and NOAA for the data that is provided from both of these agencies.

In New Jersey, significant strides have been made. As a matter of fact, the 14-point plan, with over a $200 million commitment in five years by that State to take a look at non-point source pollution, particularly combined sewer overflows, and addressing storm water management, is very important and is quite a mammoth effort for that State to undertake.

Again, EPA grants are going to need to be relied upon so that these problems resulting from sewage treatment will be able to be addressed and the State will be able to continue to take steps forward to handle the problem.

In New York, Mayor Koch has recognized that combined sewer overflows, quite frankly, contribute to 882 million gallons a day of pollution and he has committed over $500 million in ten years to address this issue.

The commitment also is there with the Chesapeake Bay. Just recently, December of 1987, EPA and the various jurisdictions around the Chesapeake Bay signed a new agreement to begin to take, step-by-step, on-the-ground practical approaches to addressing the pollution problems affecting that Bay. The commitment is over $100 million annually.

In the Gulf of Mexico, Florida has been implementing the Surface Water Improvement Management Act and has already invested more than $30 million in taking a look at pollution input from different land uses and how the pollution affects the coastal waters.

There is also a joint effort, as you are well aware, under the pilot projects of near coastal waters with EPA involving a bi-state effort of Alabama and Florida on Perdido Bay. Both States are addressing non-point source pollution in that Bay.

In the Pacific, what has already been referred to as great strides for Puget Sound, is ensconsed in the National Estuarine program of EPA. These EPA funds are needed, but it should be known that the State commitment out of Washington has been $20 million a year.

Again, we have an effort in Oregon with their Coastal Research and Planning Act. They rely upon EPA's near coastal water effort of around $350,000 for the Coquille Estuary.

In the Great Lakes, there has been an agreement signed which deals with toxic substances. It is a control agreement, and over $10 million is being invested annually. Fisheries Consumption Advisory Committees have also been established among the Great Lakes States.

The commitment is there, Senator. It is there from your state; it is there from the States that comprise this Subcommittee; and it is there from the other coastal states. But what these states need is a commitment; a continuing one from the Federal Government.

Coastal States Organization has three basic recommendations to make, and for the Committee to consider with all due respect to the Subcommittee. We have mentioned on numerous occasions a tightening, a strengthening of coordination, but we have a vehicle, and this vehicle has been in existence to address this tightening and strengthening of coordination, not just among the Federal agencies, but also with the Federal agencies in the States. This vehicle is the Federal Coastal Zone Management program created by the FCZMA which Congress passed in its wisdom in 1972.

Coastal States would like to see that Federal Coastal Zone Management Act used to the fullest to be able to strengthen and to be able to address and coordinate state concerns with Federal concerns.

The second recommendation that Coastal States Organization would like to make is that with respect to data. It was very good to hear Dr. Bud Eiler mention the fact that some of these reports dealing with status and trends and overall macro-assessments will now be geared toward monitoring and perhaps toward a more micro approach so that information that comes from NOAA and information that comes from other Federal agencies will be in a usable form. This is very important to the States.

We were really pleased to hear that EPA agreed that States could use some of the grant funds to address non-point source pollution problems in the Chesapeake Bay, in particular. We are very thankful that decision was made, but Senator, I must say, it took a heck of a battle to get that to happen.

That is important. States need to be listened to by Federal agencies so that we can attain this coordination and this tightening and this strengthening.

Finally, Senator and members of the Subcommittee, this isn't new to you, because you have heard it so many times, but that comment is the commitment must be long-term. It has to be long-term. There is no quick fix.

When we see funding sources being reduced on a myriad of levels, it makes it very difficult for States, then, to say, "Well, we have committed X amount, but the Federal Government is reducing their amount. That means we are either going to have to assume that responsibility with our funding or we may have to reduce our own."

So the commitment needs to be on all levels by all parties. Finally, I would like to, with all due respect, Senator, mention that the National Governors Association provided to us their statement to be submitted into the record of which I have a copy.

Thank you very much.

[The statement from the National Governors' Association follows:]

National Governors' Association

John H. Sununu
Governor of New Hampshire
Chairman

Raymond C. Scheppach
Executive Director

D-48. OCEAN AND COASTAL POLICY

48.1 Preface

The United States is blessed with over 95,000 miles of beaches, bays, wetlands, estuaries, and islands which are critical to the economic and natural resource base of the nation. These coastal areas contribute greatly to the economies of coastal communities and the nation as a whole by supporting tourism, public recreation, waterfront and energy development, national defense, ports, and transportation. These areas also provide critical habitat for a wide range of ecologically and commercially valuable fish, shellfish, birds, and other aquatic and terrestrial wildlife, including a number of threatened and endangered species.

Pollution from land-based and ocean sources, however, continues to threaten and degrade our coastal water areas. Unless current levels of ocean disposal, pipeline discharge, and nonpoint source pollution are reduced, these vital waters may no longer be able to support essential dependent uses.

The Governors recognize the important role of the states in protecting and managing the use of coastal resources. As the guardians of public trust rights and the primary administrators of coastal management, water quality, and wetland protection programs, the states have historically recognized and accepted this responsibility.

48.2 Recommendations

The National Governors' Association believes that the protection of our coastal and ocean waters should be one of our nation's highest priorities and recognizes the important role of both state and federal governments in achieving this objective.

48.2.1 The Governors urge that initiatives of the EPA, the NOAA, the Corps of Engineers, and the U.S. Coast Guard under the Clean Water Act, the Coastal Zone Management Act, and the Marine Protection, Research and Sanctuaries Act, including the national estuarine research program and the national estuary program, be improved and more effectively coordinated to provide the necessary comprehensive planning and management to lessen, avoid, or reverse the degradation of our nation's coastal waters; further, it is essential that we begin to view estuarine systems and their uses as an integrated whole and manage them as such. Management conferences pursuant to the Clean Water Act, joint ventures with EPA on estuaries of national significance, and similar initiatives are important tools for providing the needed comprehensive intergovernmental approach that will be necessary to address this issue.

48.2.2 Due to the serious problems caused by plastic pollutants in the world's oceans and their impact upon coastal waters and marine resources, the Governors support the implementation and enforcement of Annex V of the MARPOL Convention which regulates the ocean disposal of refuse from ships and bans the disposal of plastics in the marine environment.

48.2.3 To assure adequate protection in the event of oil spills in ocean and coastal waters, Congress should approve legislation establishing a comprehensive oil spill liability and compensation system and recommend Senate consent to ratification of the 1984 International Protocols on oil spill liability and compensation. In recognizing the important role of the international community, the federal government, and states in protecting ocean and coastal resources, the Governors also urge Congress to preserve the right of the states to administer their own oil spill funds.

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48.3 Exclusive Economic Zone

In 1983, by presidential proclamation, the United States asserted sovereign rights over the Exclusive Economic Zone (EEZ), which extends 200 nautical miles seaward of the nation's coasts. With this action the United States acquired internationally recognized sovereign rights "for the purpose of exploring, exploiting, conserving, and managing the natural resources, both living and nonliving, of the seabed and subsoil and the superjacent waters," the protection and preservation of the marine environment, and other economic activities.

The Law of the Sea Treaty and the EEZ Proclamation fundamentally altered the legal character of the resources in this 200-mile zone. Prior to the EEZ proclamation, marine resources beyond the three-mile Territorial Sea were considered to be fundamentally international in character, because the management of these resources could affect relations with foreign nations. This characterization was the basis for a series of Supreme Court rulings that the federal government was the proper entity to assert exclusive jurisdiction and control over offshore resources. Thus, until the EEZ Proclamation, the United States' assertions of jurisdiction over resources beyond the Territorial Sea were generally based on two regimes – a 200-mile fisheries zone in which the U.S. government claimed exclusive management authority over the fishery resources, and the regime of the continental shelf by which the U.S. claimed exclusive rights and control over the resources of the seabed and subsoil of the geographic continental shelf of the United States.

Today, by force and effect of the proclamation, the conservation, exploration, and development of the U.S. EEZ resources are domestic concerns, separate and distinct from international uses such as the high seas freedoms of navigation and overflight. Management of these resources will no longer affect relations with foreign nations. Thus, the conservation, exploration, and development of resources in the U.S. EEZ are now legitimately the joint concern of the federal government and the states, territories, and commonwealths (the states) of the United States.

In light of the EEZ Proclamation, the rights and obligations of the federal government and the states in the management of the resources of the U.S. EEZ must now be re-examined. Accordingly, to carry out their new responsibilities, the Governors are committed to assuming a full partnership with the federal government in the management of the U.S. EEZ resources, and to continuing to improve their competence for ocean and coastal management.

This partnership should be based upon the recognition that the states have inherent rights and responsibilities pertaining to the conservation, exploration, and development of the resources in the U.S. EEZ, stemming from their constitutional sovereignty, and the state and local impacts of exploration and development in the U.S. EEZ. Further, the partnership should also be based upon the recognition that the federal government has rights and responsibilities pertaining to the conservation, exploration, and development of the resources in the U.S. EEZ, stemming from its constitutional authorities and responsibilities and by virtue of the unique nature of some of the U.S. EEZ resources. Finally, the partnership should be based upon the recognition that the states and the federal government have trust responsibilities for citizens of the nation as a whole in the extraterritorial area of the U.S. EEZ.

The Governors believe that a real and effective partnership is necessary in the management of the EEZ:

- The states should enhance their capabilities for ocean research, public information, education, and resource management;
- Federal agencies should refrain from enacting regulations that are inconsistent with the principles of partnership;
- Congress should enact legislation for the management of hard mineral resources in the EEZ based on the principles of partnership;
- Congress should establish a National Oceans Policy Commission whose membership includes several Governors. The commission should be charged with developing a comprehensive marine policy and reporting to the President and the Congress with comprehensive recommendations including the development of an active and full partnership between the federal government and the states for the management of U.S. EEZ resources.

Adopted July 1987; revised February 1988.

Senator **Mitchell**. Thank you, Dr. Taylor.

Is it fair to say that you are less impressed by the words you heard this morning from the Administration than you are with the budget proposals that the Administration has previously submitted on the same subject?

Dr. **Taylor**. I would say that would be a good conclusion, Senator.

Senator **Mitchell**. What is the old phrase? "Put your money where your mouth is," I guess?

Dr. **Taylor**. Yes.

Senator **Mitchell**. It is a very difficult problem in a time of budget constraint. Thank you very much.

Dr. **Taylor**. Senator, I just wanted to add, coming from the State of Maryland, which did, by the way, receive a great benefit, as well as the Commonwealths of Virginia and Pennsylvania and the District of Columbia with EPA's effort on the Chesapeake Bay, I know what the effort has been with respect to that estuary. But on the other hand, representing Coastal States Organization, when I speak, I must speak for them. So your conclusion applies.

Senator **Mitchell**. Let me ask Mr. Niblock, first, to commend your office for the development of the useful and timely assessment of the threats to the marine environment. Your report has already been discussed. I have quoted some of the key findings.

I was interested in your reference to the need for an overall guiding philosophy specifically oriented to estuaries and coastal waters and your reference to an effort underway in Canada to develop such a general policy.

Could you tell us a little more about why you think such a policy is needed, what it might address, and what the current status of that effort is in Canada?

Mr. **Niblock**. Yes, Senator. Thank you for your kind words on that report. There is an organization known as Environment Canada which includes a number of the federal agencies responsible for pollution and for fisheries management in national parks.

They are going through a sort of national debate on the issue of the need for and the national framework to aid and prevent in marine environmental protection issues. The debate is taking place within the context of existing legislation, existing Canadian legislation and international legislation.

Some of the questions that they are asking themselves is: Is a national effort needed to identify needy water bodies? Is a national program to stimulate development of plans needed? Should national guidelines for such plans be issued? And will enough plans and programs be implemented? And what about the areas that are lacking active citizens groups or state agencies? what will happen in those areas?

Senator **Mitchell**. Thank you very much, Mr. Niblock.

Senator Stafford.

Senator **Stafford**. Thank you, Mr. Chairman, very much. Let me first say that I have been ruminating with pleasure on the remarks of the Chairman of this Subcommittee when I first came in.

Now that Senator Chafee is also here, I have to think it only fair that as the former chairman of this Committee, I say that none of the good things that we think happened during my watch over the last 8 years would have happened had it not been for the very key roles played by the Chairman of this Subcommittee, Senator Mitchell, and the former chairman of this Subcommittee, Senator Chafee.

So that I appreciate what they have said, and I want the record to indicate I know how principally important they were in getting the things done that this Committee has accomplished.

To the witnesses, one question, and that is this, without disagreeing in any way with what you have all said. I think I have, maybe, spent more time on Chesapeake Bay than any other member of the Senate in the last 25 years. I have had a chance to observe how things have been going there.

Would you comment on whether or not overfishing may have played a role in the fact that there are fewer shellfish, certainly in the Chesapeake Bay, now, and I think probably fewer crabs and far fewer finfish than were there a quarter century ago.

This may be true on the Maine coast also, so I would ask, first, Mr. Niblock, if you would care to comment on that?

Mr. NIBLOCK. It is hard to say if overfishing alone was responsible.

Senator STAFFORD. I don't think it is alone. I think it is part of the combination with the other factors you have been discussing.

Mr. NIBLOCK. Yes. Yes. But I think it is fair to include it as one of those factors, and intensity of effort certainly has increased in the Bay.

Senator STAFFORD. All right. Thank you. Mr. Curtis, would you comment?

Mr. CURTIS. I would agree with what Mr. Niblock has said. I think that overfishing is one element of the problem. In relation to fishing, an important concept was put in place in 1984 by the National Marine Fisheries Service, calling for an "ecosystem of the whole" approach in dealing with fisheries—not just looking at fish and the fishermen, but looking at the whole system. I think that overfishing, in tandem with these other factors, needs to be looked at from an ecosystem perspective.

Senator STAFFORD. Thank you. Dr. Taylor.

Dr. TAYLOR. Senator, yes. It is a contributing factor. However, what we have found, and this is speaking for the State of Maryland, is that the overriding factor has been the pollution, and speaking for the Chesapeake Bay, you are very familiar with the Bay, and you know it is very much like a bathtub, and the water tends to stay in there and swash back and forth. Our fisheries also are migratory fisheries.

So what may be done in one State, if it is not agreed to and done by another State, that also contributes, as well. So there are a number of factors, but it has been basically the pollution.

Another key point, too, is that for a long time, all of us in this nation have looked at point source pollution and non-point source pollution and the health of the individual as being the monitoring condition, whereas if we set our standards for water quality with the human population, we are going to have a detrimental effect on our fisheries population because they are more sensitive.

I think if anything, the Federal effort and State effort has gone toward increasing the knowledge of where we need to begin to set our standards. Unfortunately, a lot has happened between then and now.

Senator **Stafford**. Thank you all very much. Thank you, Mr. Chairman.

Senator **Mitchell**. Thank you, Senator Stafford.

We are pleased to be joined by the former chairman of this Subcommittee who has more than earned all of the lavish praise that both Senator Stafford and I have heaped upon him here today. It is a good thing he hasn't been here to hear it all. He would be embarrassed, being a modest fellow.

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator **Chafee**. No, I don't think I would be embarrassed at all. As a matter of fact, I think I will look up the record and savor every word that is there. First, Mr. Chairman, I want to thank you very much for holding these hearings.

You have evidenced such a tremendous commitment to protecting our marine and near coastal waters from pollution. Every word that Senator Stafford said about your leadership, I second. You have been tremendous on this Committee, and we are grateful to you, not just as Members of the Senate, but as American citizens, for what you have done.

Senator **Mitchell**. Thank you, Senator.

Senator **Chafee**. I want to thank Senator Stafford for his kind remarks and for the leadership that he gave to this Committee during the 6 years that he was Chairman.

I have a statement which I would submit for the record, Mr. Chairman.

[Senator Chafee's statement follows:]

Opening Statement of Hon. John H. Chafee, U.S. Senator From the State of Rhode Island

First let me thank the distinguished chairman of this subcommittee, Senator Mitchell, for his strong commitment to protecting our marine and near-coastal waters from pollution. The fact that we are holding this hearing today to learn about the seriousness and extent of threats to our marine environment is evidence of the importance Senator Mitchell attaches to this subject.

Recently we have all seen alarming headlines referring to coastal waters: "Troubled Waters" proclaimed Business Week, with the sub-heading "The World's Oceans Can't Take Much More Abuse". A recent New York Times article was titled, "A Tide of Coast Contamination", and both Time magazine and Newsweek have carried cover stories on the deterioration of our coastal environment.

The purpose of this hearing today is to receive expert testimony on whether the environmental quality of our marine and near-coastal waters is presenting us with a national crisis. A dwindling catch of fish in many areas and increasing amounts of debris washing up on our shores are but symptoms of a larger problem. Questions we will be asking today will focus on the magnitude of this problem, what are we doing to remedy it, and what steps must be taken in the future to ensure a healthy ocean environment for our children's children.

This morning many of us here met for breakfast to discuss the results of a landmark conference, sponsored by the Environmental Protection Agency and sixty-five environmental groups, entitled, "Saving Our Bays, Sounds and the Great Lakes." The participants in this conference have done an excellent job of documenting the major sources of ocean pollution, and have offered some insightful recommendations on how to rectify the damage. I am pleased that we will be hearing testimony today from an eloquent spokesperson for this conference, Ms. Trudy Coxe.

The fishing industry will also be well-represented here today in the person of Mr. Ken Coons, chairman of the New England Fisheries Development Foundation. Fishermen have a strong and vested interest in preserving the habitat from which they derive their living. Fish, because of their sensitivity to certain pollutants and their tendency to bio-accumulate heavy metals such as mercury, often serve as a warning indicator. Recently this indicator light has been flashing.

I look forward to enlightening testimony from all our witnesses, including Mr. James Barnes of the EPA. Welcome, and thank you for coming.

Senator CHAFEE. I just want to point out one brief thing, if I might: This morning, there was a breakfast that was sponsored by myself and Congressman Lowry from the House, and by the Environmental Protection Agency and 65 environmental groups which was entitled "Saving our Bays, Sounds, and Great Lakes" and the participants in that conference did an excellent job of documenting the major sources of pollution and have offered some insights for recommendations, which, along with those we have already heard here, I think are going to be a great help to us.

Mr. Chairman, I have no questions, but I do want to say, like you, I am having to deal with two committees at once. I know you are familiar with what we are trying to do in the Finance Committee at this very moment. Thank you.

Senator MITCHELL. Thank you, Senator Chafee. Thank you, Dr. Taylor and gentlemen. We appreciate your contribution to this Committee's deliberations.

Senator MITCHELL. The next panel includes Ms. Trudy Coxe, Executive Director of Save the Bay, Providence, Rhode Island; Dr. Donald Boesch, Executive Director of the Louisiana University Marine Consortium; Mr. Ken Colns, Executive Director of the New England Fishers Development Foundation; and Mr. William Gordon, Executive Vice President of the New Jersey Marine Sciences Consortium.

Senator CHAFEE. Mr. Chairman, while they are getting seated, could I just welcome two citizens from my State. Both have been long active in the environmental field, both of whom I have had the pleasure of knowing for many years.

Trudy Coxe is Executive Director of Save the Bay, which is our largest, by far, environmental organization in the State, and of course, as I pointed out, she is also Chairman of this new group of 65 environmental groups combined together to save our bays, estuaries, and inland waters. We are just so glad she is here. She is a great environmental leader, statewide and nationally.

Ken Coons I have known for many years. He is very active in the fisheries area and is now Executive Director of the New England Fisheries Development Foundation and a top-notch citizen in Rhode Island.

Senator MITCHELL. Thank you very much, Senator Chafee.

We will begin with Miss Coxe.

STATEMENT OF TRUDY COXE, EXECUTIVE DIRECTOR, SAVE THE BAY, PROVIDENCE, RI

Ms. COXE. Thank you very much, Senator Mitchell. I appreciate very much having the opportunity to come down to Washington to talk a little bit about Narragansett Bay and the problems that are facing us. I want to point out for those people who think that Rhode Island is very far away and very tiny, that the next time you open up a can of Campbell's or Snow's Clam Chowder, remember that the clams in that can came from a Narragansett Bay dealer, and in fact, one-quarter of the Nation's demand for little necks, cherrystones, hard shell clams is met by our quahogers in our little State.

There is a jolting remark by David Brower, a well-known, controversial environmentalist that goes, "All we ever win on our side is a stay of execution for whatever it is we are trying to save. As long as what we are trying to save is still there, somebody is going to try to get it." I think that is where our Nation's bays are right now and where those of us who are in the business of saving bays are, as well.

There are a lot of us around the Nation, as Senator Chafee mentioned, who are very, very frustrated and concerned about the conditions of our bays and estuaries and our sounds and the Great Lakes to the point where we are desperate for help from you, Senator Mitchell, and you, Senator Stafford, and everybody here in Washington.

I want to submit for the record this book called "Saving Our Bays, Sounds, and the Great Lakes: The National Agenda," and also my testimony, but I want to just go through the five points that were believed to be, by the 65 groups who represent nearly ten million Americans, the things that have to be done if we are really going to correct the situation.

Just very quickly, the Nation must adopt a subsidy-busting program. We are, right now, spending lots of Federal dollars not only encouraging growth in the coastal area, but subsidizing it, and that is not having a good impact on our coastal areas.

The Nation must adopt a source reduction program. We talk a lot about whether we should dump offshore; whether we should incinerate in people's back yards; whether we should landfill. That is not the solution to our toxic pollution problems. The real solution is beginning to get industry and individuals to get rid of the stuff in the first place.

The third point was America needs to save its wetlands. It is really frightening to think that we have lost nearly 60 percent of our wetlands in this nation, and yet we continue to talk about doing something about it. When are we really going to do something about it? We need to save our wetlands, and we need to restore 10 percent of the wetlands that have already been lost.

A fourth agenda item was the fact that the nation needs an aquafund program. We are finding not only in Narragansett Bay, but in the Great Lakes, in Puget Sound and around the country that the contaminated sediments at the bottom of our bay, in and of themselves, a pollution source, and we are not paying attention to that problem. Yet we see cancers and tumors and ulcers in our fish. We see fish being put on advisories. We need to do something about cleaning up those contaminated sediments.

Finally, we need some environmental law and order. You all are really the authors of some tremendous laws that are on the books, but you don't have to look very far to know that we are not enforcing the great laws that were established to the degree that we can.

Our bays are in trouble, not just Narragansett Bay, where a third of our bay is closed off to shellfishing. That is true for the country, by the way; where our clams are not reproducing well, which concerns us greatly, because we have got 3,200 shell fishermen who depend upon Narragansett Bay as their resource, where cancers, tumors and ulcers are being found in our fish and where the immune system of our fish life is weakening.

Not just Narragansett Bay is affected, but all bays, and I think this book shows that. Since I have only got five minutes, I want to spend my time on the last question that you, Senator Mitchell, asked in your letter, "Should the Federal government or the States take additional steps to respond to environmental problems in marine and coastal waters, and what steps should be taken?"

The answer is a most emphatic, "Yes." The Federal Government needs to take the issue of toxic pollution of our bays seriously. It doesn't, or the recommendations in this book wouldn't exist. The Federal Government needs to address the issue of environmental law and order. It hasn't. Why else would there be reports that show that despite the fact that the law exists to take action, three out of four sewage plants in this nation are not doing what is legally mandated to keep toxics out of our waterways.

I come from the birth place of the industrial revolution; that is Rhode Island. So for more than 100 years, industry, primarily the jewelry industry, has conveniently dumped toxics into Narragansett Bay with staggering effects, which I have already mentioned. Despite the damage, despite the rules, despite public health concerns, toxic pollution of Narragansett Bay continues to take place.

Although absolutely necessary because it makes the producer pay for the cost of the pollution problems being imposed upon society, pretreatment is a costly way to deal with the problem. In Rhode Island, a typical jeweler spends tens of thousands of dollars to comply with regulations and what is he left with? Sludge for which there is often no viable disposal option. This will actually be the case come August 8th when a land disposal ban on metal hydroxide sludge goes into effect.

We met yesterday with Lee Thomas and were discouraged to hear that after two and a half years, we still don't have sludge regulations on the books. We believe that the Federal government has got to lead this nation away from time consuming, emotion-filled arguments and debates about dumping our toxics at sea, burning our toxics on land, hiding our toxins undergrounds; lead us away from these arguments into this direction of source reduction.

So to answer your question, Senator Mitchell, we believe that Congress has a long way to go in helping us drive home the fact that toxic pollution of our base has got to be stopped; that environmental law and order has to become the status quo, not the exception. The national policy stated in the RCRA rules say, and this is a quote, that "—wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible."

We believe that mandate should be taken seriously. We believe that Congress must act now and put an aggressive source reduction program in place. Currently, the Senate is reviewing a bill—I am sorry that Senator Lautenberg didn't stay around—titled "The Hazardous Waste Reduction Act." It would provide $10 million in seed money to create State programs for source reduction.

We believe that level of funding is insufficient, but we believe it is also an initiative that is long overdue, needs to be supported, and we hope that you would take some great leadership in that area.

Thank you.

Senator MITCHELL. Thank you, Miss Coxe.

Dr. Boesch.

STATEMENT OF DONALD BOESCH, EXECUTIVE DIRECTOR, LOUISIANA UNIVERSITIES MARINE CONSORTIUM

Dr. BOESCH. Thank you very much. Senator Mitchell and Members of the Committee, I have been asked by staff to particularly address the problem of the deteriorating quality of our coastal and estaurine waters in the Gulf of Mexico. I will comment only briefly on the Gulf of Mexico specifically. Many of the thoughts about the importance of the Gulf and its environmental problems are included in an EPA pamphlet on "The Gulf Initiative," which we will furnish to the Committee.

The Gulf Coast is our nation's most economically important coast by almost any economic standard. However, the problems caused by nutrient overenrichment, toxics, habitat degradation, freshwater diversion and risk to public health are less well documented than in other parts of our nation.

In part, this is the result of a disproportionately low level of Federal funding of marine research which has been directed to the Gulf, which we hope can be rectified. Much of the testimony today concerns problems resulting from point and non-point discharges into coastal waters.

The Gulf, too, has its share of these problems. An EPA analysis has indicated that twelve of the nation's 26 most vulnerable estuaries with respect to these types of discharges are located along the Gulf of Mexico. However, I want to emphasize two other serious problems: physical habitat modification and riverine drainage input. These were mentioned earlier in the testimony by EPA.

These may pose more serious and recalcitrant problems than the coastal inputs of pollutants directly. Despite various regulatory efforts, we are continuing to witness the physical destruction or modification of valuable coastal habitats, including wetlands, seagrass beds and tidal flats. We don't even know the rates of these habitat losses.

In Louisiana alone, the annual loss of coastal wetlands has been estimated to be 50 to 60 square miles per year. But this problem is not confined to Louisiana. For example, only 6 percent of the tidal wetlands in the San Francisco Bay area remain; Tampa Bay has only 20 percent of its original seagrass beds.

Fully 22 Federal legislative mandates assign responsibilities in this area of marine habitat protection to six Federal agencies. Despite these extensive, shared responsibilities, only $14 million was expended by Federal agencies in 1986 in habitat related research, development and monitoring. The habitats being lost or modified play a critical role in the reduction and replenishment of living resources.

Furthermore, as opposed to water quality conditions, many of these losses are largely irreversible. Greater emphasis on habitat modification is needed in national research monitoring and management programs. Particular attention should be directed to mitigation and restoration of physical losses on a variety of scales, from less than an acre to hundreds of square miles, as in the case of the needs of the Mississippi Delta.

For this, we need proactive programs in which technology is actively applied working with, rather than against, natural processes. Strict regulations alone will not solve these problems.

In many of the most productive coastal regions of this country, inputs of pollutants from rivers significantly exceed the point and non-point source inputs directly into the coastal waters. There is recent evidence of an alarming increase in the flux of potential pollutants, particularly nutrients, from the interior of the country to the coastal ocean. A recent analysis by the U. S. Geological Survey showed a dramatic increase in nitrate discharges into the coastal zone over a seven-year period prior to 1981; a 32 percent increase in the Northeast coastal area; 20 percent in the southeast; a 46 percent increase in those seven years in the Gulf of Mexico and a 36 percent increase in the Great Lakes.

Changes in riverine inputs may overshadow any local source reductions, making management efforts to reduce eutrophication, for example, ineffective. These inputs also involve many States because of the large drainage areas in these major systems, and therefore, they have national implications and demand national responsibility.

Unfortunately, because of the diffuse and daunting nature of such phenomena as the large-scale eutrophication which may be resulting, riverine drainage basin inputs to the coastal waters are receiving very little attention in research and management programs.

Reversing the trends of deteriorating coastal environmental quality will require much improved understanding of environmental processes on the effects of changing conditions on ecosystem productivity and integrity. This will not happen merely by increasing the level of funding for research, development and monitoring. New approaches will be required which employ not only scientific innovation, but involve new organizational models in order to overcome the piecemeal, parochial and myopic characteristics of past efforts.

These new models include: One, regionally-planned and coordinated research and monitoring; two, focused interagency research tied to critical management questions; and three, nationally-coordinated studies with a strong comparative emphasis.

An example of the limitations of the piecemeal approach is provided by an on-going National Research Council evaluation of marine environmental monitoring in which the Southern California Bight is a case study. At least $22 million per year is spent by public agencies and utilities in the Southern California region for marine environmental monitoring there. Most of this is end-of-the pipe monitoring, which, while technically competent, is uncoordinated and perceived by virtually all parties as insufficient to determine whether it is safe to swim in the ocean, whether it is safe to eat seafood, and whether living resources in ecosystems are being adequately protected.

Some coastal environmental problems are of such a crisis proportion as to merit a mini-Manhattan Project approach, an intense dedicated effort toward specific management goals. An example, I believe, is the wetlands loss problem in Louisiana for which solutions are being desperately sought. In response to the directives from the Senate, the Geological Survey and the Fish and Wildlife Service have developed a plan of aggressive and coordinated studies to attack these problems of coastal erosion processes and marsh management.

Finally, the Federal and academic research communities are in the process of developing nationally-coordinated programs which promise major breakthroughs in our understanding of estuarine and coastal marine ecosystems.

NOAA's proposed estuary research program, which you heard something about earlier, will initially emphasize the relationship of habitats to the production of living resources.

The National Science Foundation's Land-Sea Interface Initiative will attempt to understand how changes in the flux of critical materials from the landscape, including nutrients, sediment and potential toxicants, will affect coastal ecosystems.

Although scientists have been long working on these issues, the potential for quantum advances is offered by approaching them through carefully coordinated, sustained and parallel studies in representative systems.

In summary, we find ourselves at the intersection of an unprecedented need for information and the technical opportunity to make major strides in our practical understanding of coastal ecosystems. Thank you.

STATEMENT OF KENELM COONS, EXECUTIVE DIRECTOR, NEW ENGLAND FISHERIES DEVELOPMENT FOUNDATION

Mr. Coons. I would like to comment briefly on my written testimony. I am Ken Coons, Executive Director of the New England Fisheries Development Foundation. We are a New England based trade association of fisherman's organizations, processors and marketers of seafood.

I talked with a number of fishermen and two well-qualified researchers to try to prepare myself for being here today, and what struck me was how little all of them knew about the effects of pollution on the marine environment. I came away impressed with how poorly equipped we all are to make decisions about it. That is one of the reasons that I welcome your legislative initiative, Mr. Chairman, which would coordinate and focus existing research programs on a regional basis to provide the necessary knowledge base.

Many fishermen perceive that pollution is a pervasive force working to reduce fisheries stocks, but they lack conclusive proof. The effect of pollution on commercial fishing is more clear in the estuarine and inshore fishery, where species like bay scallops, black back or winter flounder, oysters, clams and quahogs are found. The clean-up which is finally starting in the industrialized estuaries is long overdue and probably has been undertaken just in time.

Clams, oysters and mussels are regulated according to measures of water quality which were developed in the 1920s to protect the public from typhoid fever in raw sewage.

Dr. Evans alluded to this in his earlier testimony. A recent national NOAA inventory of the 15 millions of acres of shellfish growing grounds shows that a third of this acreage is not approved for shellfish harvesting.

I am very interested in the proposed National Shellfish Pollution Indicator Study, which was initiated in Louisiana, which would develop modern standards for assessing water quality and would do the epidemiological work necessary to relate microbiological data, sanitary survey data and shellfish consumption to actual public health risk.

This kind of study could protect consumer confidence in shellfish and would probably result in the opening of some productive shellfish growing waters.

The catch of high-value ground fish species on the East Coast is way off, but nobody can really tell you why.

Experienced fishermen are catching an average of only 100 to 200 pounds a day of target species in the Gulf of Maine and Massachusetts Bay. They think the scarcity of some of the desirable ground fish stocks is attributable to some unknown combination of fishing pressure, pollution, natural predation and other environmental factors.

On the other hand, I don't think it is fair to conclude that the sea is a desert, because there are abundant stocks of hakes on both coasts, and on the East Coast, we are awash in mackerel and the sea scallops are coming back.

In the offshore fishery ocean dumping requires closer control and a better understanding of the environmental effects. Dramatic evidence of shell damage to crabs and lobsters, fin rot on tuna and tilefish, along with a dramatic drop in the lobster catch in the area of the site 106 dump has led commercial fishermen and sports fishermen to join in calling for urgent study of the effects of ocean dumping.

So it is very clear to me that we need an organized focused program of research to gain a better understanding of the effects of pollution in the marine environment.

Thank you.

Senator Chafee [presiding]. Thank you, Mr. Coons.

Senator **Chafee**. The next witness is Mr. William Gordon, Executive Vice President, New Jersey Marine Sciences Consortium. Mr. Gordon.

STATEMENT OF WILLIAM GORDON, EXECUTIVE VICE PRESIDENT, NEW JERSEY MARINE SCIENCES CONSORTIUM

Mr. **Gordon**. Thank you, Mr. Chairman. I am William Gordon, currently Executive Vice President of the New Jersey Marine Sciences Consortium. The Consortium is an educational and scientific alliance of 28 colleges and universities located in New Jersey, New York and Pennsylvania.

I also recently served as Assistant Administrator for Fisheries at the National Oceanic and Atmospheric Administration, an agency in which I served for over 30 years. So I can recognize the importance of clean water to our nation's fishery resources and to those industries which depend upon them for their livelihood.

I left the Federal Government in 1987 totally frustrated with its inability to come to grips with some of our environmental issues. So I appreciate the opportunity to be before you today to discuss environmental concerns facing this nation. I would like to thank the Chairman and his colleagues for taking the leadership and the time to hold this hearing.

My entire testimony is available for the record. I would like to also ask that two items that I recently came across would be appended to it for the record. One of them is a study which recommends Federal fisheries reorganization. The bottom line is, "Where's the fish?" and another one, an editorial by the President of the American Fisheries Society calls upon taking a look at the way we manage our fishery resources. I think it fits to the purview of this Committee, sir.

Senator CHAFEE. We will put them in the record.

Mr. GORDON. Thank you.

I was asked a series of questions in the letter of invitation. I would like to respond to those. The first question is: Whether you view as seriousness and the extent of the environmental problems in marine and near coastal waters. I view them as serious; in some areas, growing.

We are assured that waters are safe to swim in and that fish and shellfish are safe to eat. Yet constantly, we see advisories and actions by the regulatory agencies dealing with these. If I were king for a day, I would set the goal as: Fishable, swimable waters for all our coastal waters and inland waters by the year 2000.

I think that by taking care of those two items alone, we would assure ourselves that we were on the path to water quality that is acceptable for our nation. Too often, PGBs and a wide variety of substances that have been poured into our coastal and inland waters, find their way to the coastal and marine waters, and they have become major repositories for substances of this type.

In my view, it is these areas where fisheries resources are most heavily impacted. However, increasingly, fishermen are bringing ashore catches from the offshore areas, from the deep water areas, well offshore, showing increased evidence of environmental stress in the animals. We may well have reached the point of overtaxing not just our coastal waters, but our vast areas of the ocean waters.

"Where are the characteristics of environmental problems in coastal and marine waters, and how do these problems differ from inland and other waters?" They are very similar, varying perhaps in magnitude, and also in the way people deal with them.

Back in the late fifties, and early sixties people along the Great Lakes came to grips with the problems when Lake Erie was termed a dying lake. They took action then to correct some of those problems. People there no longer tolerate what we tolerate on our coastline. So I think there is a much different attitude on our inland waters.

"What are the most significant sources to contamination of marine and coastal waters?" I will speak to those issues that occurred in New Jersey last summer. There were garbage wash-ups which probably were the result of illegal dumping. Dumping garbage into the ocean, was outlawed in 1934 yet we still see garbage. Part of this comes from outflows from stormwater drains; poor trash retention while in route to landfills; bypass from wastewater treatment and other sources which include beach goers, marinas, pleasure boaters, commercial traffic of ocean going vessels, including the military. I believe that the combined sewer outflow is largely responsible for the chronic problem of floatables in the mid-Atlantic, and the solution lies with the States and local governments and must include better street cleaning, redesigned sewage collectors, screening of storm drains, better maintenance, less littering by the public and first and foremost, a massive public education program.

"What is your assessment of the economic, social and other impacts of environmental in marine and near coastal waters?"

Since early this year, I have been serving on a blue ribbon panel, appointed by Richard Dewling, Commissioner of New Jersey's Department of Environmental Protection. He asked that members of that panel address the cause and effect and look at quantifying the losses.

We held public hearings in respect to these issues. Virtually every coastal community was represented at our public hearings, and some attempted to quantify losses. We could not do a very good job of that, but without doubt, the events of 1987 in New Jersey caused considerable short-term disruption and economic losses. Only the future will determine if they are longer term.

"What is your assessment of Federal agencies 'response to threats of the coastal quality of marine and coastal waters?" Clearly, the Federal agencies responsible for environmental quality of marine and coastal waters are not doing their job. I would ask, "Who is in charge?"

An area of great concern to me that needs addressing is the current diverse nature of agencies responsible for ocean issues. If my count is correct, there are 38 Federal agencies scattered among nine executive departments that are responsible for looking after this.

The general public must deal with multiple agencies, regulations and bureaucracies. In my view, the nation can no longer afford or tolerate the inefficiencies and misapplied human and financial resources inherent in the current system.

Perhaps a focus on environmental issues should begin by establishing a clean-cut responsibility and authority. The second step would provide resources necessary to do the job. Our coastal resources are too priceless to allow further destruction.

Senator CHAFEE. Do you want to wind up? You have a little bit more to go.

Mr. GORDON. Yes, sir. The following question is,"Should the Federal government on States take additional steps to respond to problems in marine and coastal waters, and what steps should be taken?"

Illicit dumping, of course, should be stopped. There may be need for a manifest system, cradle to the grave control of the movement problems of the generators of such trash.

The 106 site, the permit expires in three years. I do not believe this permit should be renewed without radical modifications, and all levels in the government need to do a better job to come to grips with trash and management of our coastal waters. Sir, this completes my brief comments.

I would be pleased to respond to questions.

Senator **Chafee**. All right. Thank you very much, Mr. Gordon. I have a few questions.

Miss Coxe, you suggested, as one of your five points, the preservation of the wetlands and nobody argues with that at all.

You also indicated you would like to see a 10 percent restoration of those wetlands that have been destroyed. Do you have any good examples of successful restoration of wetlands? That is the so-called mitigation that we deal with under section 404. From my look into the subject, it seems to me the whole subject, the whole question of successful mitigation or restoration is questionable. I am looking for a word of cheer and encouragement.

Ms. **Coxe**. Well, let me back up by stating that the recommendations that came out of the National Conference came from varieties of people from the Puget Sound area, San Francisco Bay, Gulf of Mexico groups, South Atlantic groups and New England groups and Great Lakes groups.

Rhode Island doesn't have a lot of wetlands, as you know, Senator Chafee.

Senator **Chafee**. I am not totally parochial.

Ms. **Coxe**. But I think there are lots of examples. I am not familiar with them. The groups out West, the groups in the Gulf, the groups that came forward with those recommendations, I think the point is that overall, we all recognize that we are losing faster than we are winning.

I think one of the most disturbing facts that came out of the conference was every 14 minutes, an acre of wetland in the Gulf of Mexico is destroyed. Now, if we all like shrimp, and I guess we do, and we all like the marine, we all believe that fish is the way we should be eating, that is a pretty sad testimony.

I think that one thing that was encouraging from the conference was that there is a program just beginning in California to restore wetlands by 50 percent, so that tells me that there are plenty of examples of restoration that can occur.

Senator **Chafee**. I am not disputing it. I just am not personally aware of any that have worked out successfully. If you have some information from your folks in California, whoever it might be, if you could send that along, I would appreciate it. Because I am interested in this.

Ms. **Coxe**. I would be very happy to.

Senator **Chafee**. Dr. Boesch, perhaps you have seen it in your State, restoration.

Dr. **Boesch**. yes, sir. Your observation about the paucity of answers is, indeed, correct. There has been little follow-up of the pilot projects that have been done, for example, by the Corps of Engineers that have used dredge materials to create wetlands. However, in the Mississippi Delta, we face this enormous problem and can no longer afford to consider sediment as spoil, as waste, because it is valuable to us in our coastal systems.

Our local Corps district, which produces more dredge spoil than any other district in the United States is increasingly using dredged material for wetland restoration, but is still dumping most of it offshore or putting it into spoil banks or containments. But there are some local success stories.

Also, in our particular system, and I think this certainly relates to other systems, we have to use the forces of nature to try to restore some of these areas, not only to build new areas, but to protect areas which, left to the ravages of nature as a result of our own activities, will continue to be lost.

In the Mississippi Delta, this mainly focuses on the need for river diversions and to bring sediment back into the deteriorated wetlands and allow them to build naturally.

Senator CHAFEE. I thought the statement Mr. Gordon made that there is no environmental free lunch was really on the mark. Wherever we turn, there is a down side to what we do. "Don't ocean dump it; incinerate it." Incinerate it, then you cause smoke pollution.

"Don't incinerate it; don't ocean dump it. Landfill it." Then you have got the other side of all the problems that come. I believe that, Ms. Coxe and her group proposed cutting off the material at the beginning, don't produce it. But some of it is going to be produced. We are going to have milk cartons. We are going to have syringes. I am not sure we can turn back the clock as far as hospital disposables. Everything is disposable in a hospital now. They don't wash anything; well, not many things. We throw it right away, and usually it is plastic.

We had Mayor Koch testify on the ocean dumping, and he was his inimitable self as he raised his hands and said, "Where are you going to put it? I have got seven million people generating this waste and effluent every day. Tell me where you are going to put it. You are ridiculous in proposing there be no dumping."

I must say, we weren't able to contradict him immediately. He says it is going to cost X amount of dollars per person per day to undertake some other disposal method of it.

Let me ask Mr. Coons. You were a little bit different in your testimony here. In other words, the others felt pretty strongly that the dumping and the deterioration of the oceans is pretty apparent, but you weren't so convinced, at least having talked with your folks.

Let me ask you this. You said, Mr. Coons, in your statement:

> I think many fishermen would tell you that it is intensive and sophisticated fishing effort and not a failure of the ocean to be able to support marine life that is responsible for the low landings of some of the most popular species.

Then your next paragraph seemed to indicate that with the new vessels that are being developed and more sophisticated equipment, that they are just taking as much catch as the oceans can produce. Was that the gist of your testimony?

Mr. COONS. Fishing efficiency has greatly increased. The level of fishing on the East Coast by the domestic fleet now exceeds the fishing level by the foreign fleet, which was a lot of the motivation for the passage of the so-called 200-mile legislation.

So yes, and that is not to say that huge poundage of fish are being removed. In some of the most desirable species, the stocks are reduced to a level where, as I say, a couple of hundred pounds a day is a good day's work for a middle-sized dragger.

Senator CHAFEE. But you contradict this, not on the landings per ship, because if you get more ships out there and each one is extremely efficient, their individual landings might go by because they fish out the place, but what about the total landings, if you tracked that? After all, there must be a compilation of the landings of each species of fish at the various ports where the total arrived. Is that declining? It is in some species.

Mr. COONS. Very substantially.

Senator CHAFEE. So therefore, there is some trouble out there, isn't there?

Mr. COONS. Among the targeted species. That is why I am suggesting that intensive fishing is one of the factors.

Senator CHAFEE. You are saying that we are killing off the breeding stock?

Mr. COONS. Right. I was also careful to say that that doesn't mean that the ocean is a desert, because there are abundant stocks of other species which are not the desired species. So you have a mixed picture. What I was trying to convey is that it is not clear to fishermen offshore that pollution is a major factor. Inshore is another matter.

Senator CHAFEE. Ms. Coxe, I would like to ask you a question. One of your key points is enforcement. We have all kinds of enforcement measures, fines, and every time we mark up one of these bills for its reauthorization, we increase the penalties, and yet the toxic pollution under your testimony is continuing. Why is it continuing? Because lawyers are able to find weaknesses in our laws, or is it just the laws aren't being enforced?

Ms. COXE. My experience in Rhode Island is just a matter of will, and that will doesn't exist. One of the areas that Save the Bay is most concerned about is the discharge of toxics into the Bay because that has a serious impact on marine health. Rhode Island is the jewelry capital of the country, of the world.

Senator CHAFEE. We have pretreatment regulations.

Ms. COXE. The quantities of metals that are being discharged continues to be extremely high. In human terms, the amount of silver is the equivalent of 100,000 teaspoons that industry throws away every year. The amount of copper is enough copper to stretch a wire from here to San Francisco. We are throwing away important raw materials. It doesn't make sense.

I think what is most discouraging is that the law has been in effect for four years. We were supposed to have substantial compliance. The record says that if compliance were being carried forward, we would have had a 60 percent reduction in the amount of metals going into Narragansett Bay.

A recent study that Save the Bay is just concluding finds that maybe, maybe there has been a 15 to 20 percent reduction. That doesn't make the case that enforcement is taking place at all. I think it is a lack of.

Senator CHAFEE. What is it? The law just isn't being enforced? Is that the problem?

Ms. Coxe. The law isn't being enforced. The money to carry out the law isn't being provided. Rhode Island traditionally has not put the kind of money it should into enforcement efforts, and I don't think that there is backing from EPA. EPA has oversight on pretreatment regulations. It has the ability to say to States, and it has the ability to say to towns and cities, "Thou shalt do a better job," and that is not taking place. So everybody knows you can get away with it, and that is exactly what is happening.

Senator Chafee. All right. Fine.

Senator Lautenberg?

Senator Lautenberg. Thank you very much. Just very quickly, I welcome all members of the panel, and of course, a special welcome to our New Jersey Sea Grant program person, Bill Gordon.

Last summer, Mr. Gordon, there were over 100 beach closings in the State of New Jersey. What role do you think that the non-point source pollution, the combined sewage overflows, stormwater discharges, what role do you think these factors played in those closings?

Mr. Gordon. Probably the major role, in that a good portion of those beach closings were in the back bays, not on the ocean front itself, and the sources of pollutants would be principally from the stormwater run-off, perhaps some bypassed sewage facilities, run-off from the land, a whole range of non-point source aspects that find their way into those inland waters and eventually into the bays and then, as the bays flush, into the open ocean.

I am told there is over 5,000 storm drains in New Jersey alone that have to be dealt with. This problem, in my view, is a problem that the towns and cities and the State has to come to grips with.

Senator Lautenberg. But how about those discharges into the estuaries and into the Hudson River that kind of go out there? They are not sneaking behind the barrier reefs.

Mr. Gordon. No.

Senator Lautenberg. How about garbage discharge? How about sludge dumping? How about the fact that we have wind blowing trash into the ocean? Does any of that effect this?

Mr. Gordon. Yes, very much so. It is my view that a unique coming together of the wind current patterns and the like, tides, contributed to a lot of it coming up on the beaches that got out around or was illegally dumped or likewise, brought it to the beaches. That, particularly in central New Jersey, the garbage wash-up, the medical wastes, those were probably a result of the correlation with the prevailing winds and tidal conditions.

Senator Chafee. Are you going to wind up the hearing?

Senator Lautenberg. Sure.

Senator Chafee. I am going over to vote. I do want to thank everybody in their panels and particularly my two neighbors from Rhode Island who have been good enough to come down.

Ms. Coxe. Thank you, Senator Chafee.

Senator Lautenberg. Thanks very much, Senator Chafee. How do we address these problems? We have a multitude of them. What, in fairly short form, what do we do to address them?

Mr. Gordon. Well, there is a whole plethora. There is no single answer. Less generation is a good starting place.

Senator Lautenberg. How do you generate less?

Mr. GORDON. Yes, how do you do it? Recycling, perhaps; degradable. Let's turn away from using some of the stuff.

Senator LAUTENBERG. How do we reduce non-point pollution?

Mr. GORDON. Starting with, perhaps, farmers to bring under control plowing to the edge of the streams and banks; less use of fertilizer and pesticides.

Senator LAUTENBERG. Improvement of sewage facilities?

Mr. GORDON. Improvement of sewage facilities; pre-treatment. If we are into sewage, pre-treatment of the toxic material. Recover what is now being thrown away. Miss Coxe was talking about Narragansett Bay problems which are the same as in New Jersey in some respects.

Better management by the towns and cities. Street clean your streets more often; put storm drain screens on to collect it rather than let it run into the waterways and finding its way to the ocean; better enforcement.

Dumping garbage into the ocean was outlawed in 1934. Certainly, the implementation of Annex V of MARPOL will get some phases of that.

In terms of sanitation devices on vessels, they are required to carry them, but there is no mandate there be a place to pump them out. New Jersey has eleven pump-out stations for the entire shore line.

Senator LAUTENBERG. Is this primarily a Federal or a State problem?

Mr. GORDON. I think it is more of a State problem than a Federal problem, although the responsibility, as we move offshore, is to the Federal government.

Senator LAUTENBERG. You know we have this constant debate about the sludge dumping in the ocean. I am very much opposed to it. Obviously, we can't shut it off overnight, but I have legislation that is going to terminate it and force the creativity and the ingenuity that is ours in America and around the world to find other ways to get rid of that stuff as opposed to dumping it in the ocean. I don't care whether it is 106 miles out or 12 miles out, as it used to be until the end of this past year. Do you have any evidence that this sludge dumping is affecting fishery resources?

Mr. GORDON. Well, there is strong evidence that the 12-mile site caused problems to the marine resources. That has been well documented by the State and the National Marine Fisheries Service Laboratory at Sandy Hook.

In terms of 106, there is no strong evidence to support that this is causing the problems that fishermen are now speaking to. But the fact that there is, over the last several years—perhaps it is now being focused because of moving to 106—there is an increasing evidence that fish coming from deep water are displaying evidence of environmental stress, fin rot and lesions. This tells me that not only our coastal waters, but fish that normally inhabit the deeper waters, migrations, spawning areas and the like, are being impacted.

The fact that we are stressing not just our coastal waters, our estuary waters, but the continental slope waters, when such fish as tile fish and whiting, which spend the predominance of their life history in deeper water, are being impacted, something is going on there.

Senate **Lautenberg**. Obviously, you disagree with those that say sewage sludge dumping has no effect.

Mr. **Gordon**. I strongly feel that way.

Senator **Lautenberg**. I have written a bill to get plastics out of the ocean. It is a supplementary addendum to the MARPOL agreement. Plastics wreak havoc in the ocean, do they not?

Mr. **Gordon**. They certainly do, yes.

Senator **Lautenberg**. We thank you all for being here. I am sorry that I couldn't have spent more time. We are kind of busy around here every day, but we do thank you for your testimony. We ask that if there are additional questions that come to you by way of written inquiry, that you respond to them quickly. With that, this hearing is adjourned. Thank you very much.

Mr. **Gordon**. Thank you.

Mr. **Coons**. Thank you.

[Whereupon, at 12:17 p.m., the Subcommittee was recessed, subject to the call of the Chair.]

[Statements submitted for the record follow:]

TESTIMONY OF

WILLIAM E. EVANS
UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE

April 20, 1988

Mr. Chairman and Members of the Subcommittee:

My name is William E. Evans and I am the Under Secretary of Commerce for Oceans and Atmosphere and the Administrator of the National Oceanic and Atmospheric Administration (NOAA). I appreciate this opportunity to report on NOAA's current activities related to environmental trends and conditions in the coastal ocean of the United States.

Under Title II of the Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532) and the National Ocean Pollution Planning Act of 1978 (P.L. 95-273), NOAA conducts a comprehensive program of assessments of the effects of human activities on the marine environment. NOAA's program includes conducting national assessments of pollution problems in the coastal ocean; conducting research on the relationship of toxic contamination in marine and estuarine environments to marine mammal populations; and providing scientific advice, in real-time, for response actions during spills of oil and hazardous materials.

NOAA has made substantial progress in assessing and understanding the long-range effects of human activities on the quality of the ocean environment and coastal ecosystems. Because of the integrated nature of natural systems within the coastal ocean, our focus extends from the head of tide (or the inland extent of anadromous fish migration) to the edge of the continental shelf or seaward boundary of the Exclusive Economic Zone, including the coastal land areas that drain into these waters.

We are making a serious effort to report our scientific findings in a form that is useful to decision-makers, and I will highlight some of the activities we have undertaken jointly with the U.S. Environmental Protection Agency (EPA) to direct Federal resources toward the high priority problems of the Nation's coastal ocean. We are at the threshold of major advances in new information and techniques for understanding and managing environmental quality problems in the coastal ocean.

Environmental Quality Conditions and Trends in the Coastal Ocean -- a National Problem

The April 1987 report of the Office of Technology Assessment (OTA) on "Wastes in the Marine Environment" summarized a growing body of evidence that many estuarine and coastal areas throughout the United States are showing increasing signs of stress. Much of the evidence cited by OTA was developed by NOAA's marine and estuarine pollution programs.

While the United States has obtained significant reductions in some pollutants from major point sources, population growth and related coastal development continue to place a disproportionate strain on coastal and estuarine areas. It's a well-known fact that most Americans prefer to live, work, and play in coastal areas. More than half of our population now lives on only about 10 percent of the land area of the United States. Most of the large sewage treatment plants and industrial facilities that generate and discharge the majority of the water-borne pollution of the United States are located in coastal counties. Over 40 percent of the priority hazardous waste dump sites listed by EPA's Superfund Program are located in these same areas. Each year we make a significant public investment in maintaining the environmental quality of these areas. For example, in addition to pollution control investments in coastal areas, each year we spend almost $7 billion dollars in public funds at all levels of government to provide facilities for, and access to, marine recreation activities. This substantial public investment is threatened in many areas by declining environmental quality conditions.

To understand better the effects of human activities on environmental quality in the coastal ocean, we must improve our understanding of the effects of human activities on estuarine and near-coastal waters. As the OTA report points out, these important areas are the first to receive the vast majority of pollutants introduced into the marine environment. Estuaries, in particular, are among our most productive natural systems. The freshwater and nutrients that estuaries provide to coastal areas are critically important to sustaining the health of most living resources in these areas, and in providing important habitat, especially during the early life stages of fish, shellfish, mammals and birds. More than 70 percent of the commercially important species of fish and shellfish depend on these areas as habitat. Each year commercial and recreational catch of estuarine-dependent fish and shellfish contributes over $19 billion to the U.S. economy. Other billions spent on recreation and housing depend directly on high levels of environmental quality conditions.

The national economy and the local economies of coastal communities rely heavily on the environmental quality of estuaries and adjacent coastal waters. When beaches are closed because of pollution, fish and shellfish are determined to be unsafe to eat, or recreational fishing declines, the costs of pollution in the coastal ocean affect the entire U.S. economy.

The Priority Problems

Several studies involving NOAA and EPA, such as the June 1987 NOAA Workshop on National Marine Pollution Problems and Needs and the 1985 National Marine Pollution Program Plan, have recognized at least four major problem areas which require priority treatment:

1. Habitat loss and modification;
2. Toxic contamination;

3. Eutrophication; and
4. Declining economic and ecological productivity of the coastal ocean.

Most commercially harvested fish and shellfish depend on estuaries as habitats that are important during the early stages of their lives. But since the founding of the United States, over half of the natural coastal habitats have been lost. Almost 10 percent of the natural shoreline of our estuaries has been modified significantly by human activities. These losses continue due to development pressures, flow diversions and shoreline erosion.

Through systematic national monitoring efforts, we are gathering new evidence of relatively high levels of toxic contaminants in organisms and sediments in estuaries and near-coastal waters, particularly in urbanized estuaries characterized by weak water circulation. NOAA researchers are producing increasing scientific evidence that the effects of toxic contamination extend beyond the well-known effects of fin rot and cancers within individual animals, to more serious effects on the reproductive capabilities of entire populations of some species.

Eutrophication, a condition induced by excessive nutrients from sewage treatment plants and from agricultural and urban runoff, stimulates nuisance growths of algae, depletes oxygen dissolved in the water column, kills fish and shellfish, and causes shifts in populations of animals. About a third of the Nation's estuaries have eutrophication problems at some time during the year. Extensive areas of low dissolved oxygen exist on a seasonal basis off the Mid-Atlantic States and on the Louisiana inner continental shelf.

The cumulative result of some or all of these environmental quality conditions is a decline in the ecological and economic productivity of the coastal ocean. Landings of many estuarine-dependent fish and shellfish have declined significantly over the past 20 years. Nationwide, about a third of the shellfish growing waters that are classified for commercial purposes have some restriction on harvest. In the Gulf of Mexico, over half of the areas classified are restricted in some way.

The NOAA Program

In October 1987, NOAA completed a year-long agency-wide effort to develop an Estuarine and Coastal Ocean Science Framework to address the critical problems facing our valuable estuarine and coastal ocean environment. A major focus of this effort has been on toxics, pathogens, and excess nutrients in our estuarine and coastal ocean systems. The Framework maps out specific priorities to be addressed by NOAA's programs in assessment, research, analysis and prediction.

The NOAA program integrates two relatively new capabilities: 1) chemical and biological effects of pollution are being assessed routinely, using nationally-comparable measurements and statistical techniques previously unavailable; and 2) information and data bases are being used to produce analyses that are national in scale and comprehensive in scope. Together, they form a powerful assessment and predictive capability.

NOAA's National Status and Trends (NS&T) Program monitors chemical contaminants in bottom-feeding fish, bivalves (mussels and oysters), and sediments to determine existing conditions and long-term trends in these conditions in coastal and estuarine areas throughout the Nation. The National Estuarine Inventory uses existing data, much of which was collected through disparate programs over the past two decades, and state-of-the-art information technology to organize and present that information and bridge the gap between the situation where large amounts of information could be found for some areas, and little or none for others. The Environmental Research Labs and the National Sea Grant Program conduct or support a variety of primarily regionally-focused research efforts on such things as the coastal environment and fates and effects of pollutants.

NOAA's National Status and Trends Program

A major component of NOAA's marine pollution research, assessment and monitoring program is the NS&T Program. The NS&T Program was initiated in 1983 to quantify the current status and long-term trends in the concentrations of key contaminants and their effects on living resources in the Nation's coastal and estuarine areas. A nationally uniform set of measurements is being used to obtain high quality, long-term information on environmental quality.

The NS&T Program addresses three principal questions:

(1) how existing conditions vary among different coastal and estuarine areas;

(2) what are the temporal trends in levels of contaminants; and

(3) whether these conditions and trends induce harmful responses among valued marine organisms.

The NS&T Program has four components: (1) the Mussel Watch Project; (2) the Benthic Surveillance Project; (3) the Consequences of Contaminants Program; and (4) the Quality Assurance Program.

The Mussel Watch Project conducts annual sampling and measurement of trace elements (e.g., metals such as cadmium and mercury) and toxic organic compounds (e.g., chlorinated compounds and polyaromatic hydrocarbons) in bivalve molluscs (mussels and oysters) and in sediments at selected sites in estuarine and coastal areas. Benthic Surveillance Project activities consist of annual sampling and analysis of bottom-feeding fish (e.g., flounder) and sediments at estuarine and coastal sites. The Benthic Surveillance Project also examines fish for liver tumors, external lesions and other evidence of responses to pollutants. The focus of the Consequences of Contaminants Program is on developing techniques for determining whether fish and shellfish are threatened by pollutants found in coastal and estuarine areas. At present, the NS&T Program is committed to a "core" monitoring program of measurements that will remain relatively constant over a relatively long period of time, but with enough flexibility to accommodate new knowledge about the relative importance of pollutants, changes in analytical technologies, and changing information needs.

NS&T Quality Assurance activities promote standardization of collection and measurement techniques to ensure comparability of data among all the laboratories collecting data for the overall program. NOAA is working closely toward this objective with other agencies such as the National Bureau of Standards, EPA, the Army Corps of Engineers, the Minerals Management Service, and the National Research Council of Canada.

Some results of the NS&T Program to date include:

- Identification of estuarine and coastal sites where contaminants are most concentrated in bottom-feeding fish and sediments and the sites where these fish show evidence of response to contaminants. They include sites along the East Coast in Boston Harbor, Buzzards Bay, the waters surrounding New York City, including Long Island Sound, part of Delaware Bay, and the upper part of the Chesapeake Bay. Along the coast of the Gulf of Mexico, individual sites in Tampa Bay, near Panama City, near Fort Walton Beach, and in Galveston, Matagorda, San Antonio, and Copano Bays in Texas are contaminated, but these may only indicate very local sources since nearby sites do not display high levels of contaminants. Along the West Coast, relatively high concentrations of pollution are evident inside San Diego Bay, along the coast near Los Angeles, and in parts of San Francisco Bay and Puget Sound. There are also isolated sites with high contaminant levels on the coasts of northern California, Oregon, and two sites in Hawaii. All require continued monitoring to determine whether or not the contamination is unique to the sites or is, in fact, indicative of pollution throughout entire estuarine systems;

- A NOAA data base now allows efficient access to existing data, easy updating of new data, and straightforward analysis of data to examine spatial and temporal trends in environmental quality throughout the Nation;

- Data collected in past years under other Federal, State, and local programs on levels of pollutants in marine organisms are being continuously collected and catalogued so that NS&T results can be evaluated from an historical perspective. This historical data base now contains about 25,000 records on the concentration of polychlorinated biphenyls (PCB's) and chlorinated pesticides (*e.g.*, DDT) in fish and shellfish; and

- We have identified areas in Puget Sound, San Francisco Bay, and off Southern California where contaminant levels are very high and where fish are incapable of normal reproduction. While these areas are of limited spatial extent, knowledge gained in these areas is being used to develop techniques to identify biological responses at broader regional and national scales. These techniques and new measurements will be incorporated into the NS&T Program.

NOAA's National Estuarine Inventory

Development of the National Estuarine Inventory (NEI) began in late 1983. The first volume of the NEI data atlas series was completed in 1985. It identified 92 estuaries in the contiguous United States, summarized important physical and hydrologic information for each, and defined the spatial units for analysis (estuarine drainage areas) into which other information already being developed could be organized. It showed that almost 75 percent of the Nation's estuarine waters are located in only 18 estuaries, but that important estuaries exist throughout the United States. Since completion of the first volume, nine more estuaries have been added to the inventory and another five or six will be incorporated soon.

The second NEI volume, published in 1987, provided a comprehensive data base on and assessment of land use throughout the drainage basins directly affecting estuaries. While land use varies among estuaries, patterns and relationships that may ultimately affect how we develop policies to manage estuarine and coastal waters are now apparent. For example, we now know to what extent and where various human activities dominate the way in which land surrounding estuaries is used.

The National Coastal Pollutant Discharge Inventory (NCPDI), a marine pollution data base whose development began in 1981, is being improved and expanded within the NEI framework. The NCPDI now includes estimates of pollutant discharges from all point, nonpoint and riverine sources into estuarine, coastal and oceanic waters of the contiguous United States, extending landward to the head of estuaries and seaward to the boundary of the Exclusive Economic Zone (EEZ). We have been able to provide a large number of users, including EPA, with information on estuarine and marine pollution sources and their discharges. We know that major sewage treatment plants in coastal counties account for 40 percent of all wastewater discharged in the United States and that about a third of this flow receives only primary treatment (i.e., only solids are removed with no biological treatment of the waste). Residential sources account for about 60 percent of total wastewater discharges from sewage treatment plants and industrial sources account for the remaining 40 percent. We now know the total loading of nitrogen and phosphorus that estuaries along the east and west coasts receive each year -- about 900,000 tons of nitrogen and 200,000 tons of phosphorus. Of these amounts, about 56 percent comes from sources upstream of coastal counties within estuarine drainage areas, 15 percent comes from nonpoint sources, and 28 percent from point sources in coastal counties within estuarine drainage areas. Similar information is available for individual estuaries or groups of similar estuaries.

Another project being developed with the framework of the NEI is the National Coastal Wetlands Data Base. Wetlands provide habitat for fish, shellfish and wildlife, filter and process agricultural and industrial wastes, shelter coastal areas from storm and wave damage, and help generate large revenues from a wide variety of commercial and recreational activities. Disappearance of wetlands at an estimated rate of 20,000 acres per year over the past 25 years is reason for national concern. Louisiana loses about 60 square miles of wetlands each year. San Francisco Bay has lost about 75 percent of its original wetlands.

A National Shellfish Growing Waters Data Base is being developed within the NEI framework, compiling and analyzing information on classified shellfish waters as an indicator of coliform bacteria pollution in estuaries. Estuarine waters are classified by individual States on the basis of fecal coliform levels as approved, prohibited, conditionally approved or restricted for the harvest of oysters, clams and mussels. The National Shellfish Growing Waters Data Base has involved compiling 1985 classification data by State, reorganizing the data into the estuaries identified in the NEI, identifying those waters classified for reasons other than coliform bacteria contamination, and identifying the sources of contamination by areas within estuaries.

Out of a total of 20.7 million acres of estuarine surface waters identified in the NEI, 14.2 million (71 percent) were classified for shellfish harvesting in 1985. Over 40 percent of these areas are in the Gulf of Mexico. The greatest percentage of waters approved for shellfishing is in the Northeast (Maine through Virginia) where 89 percent (4.7 million acres) of the 5.5 million classified acres are unconditionally open for harvest. The greatest number of prohibited acres is in the Gulf of Mexico. In a new NOAA report on shellfish waters in the Gulf of Mexico, sources of contamination are identified for those areas classified as conditionally-approved or prohibited. Preliminary findings indicate that in the Gulf of Mexico, 61 percent of classified waters have some restriction on shellfishing. Of these restricted waters, 40 percent are affected by septic systems, 30 percent by urban runoff, and 29 percent by sewage treatment plants. Upstream freshwater discharges to estuaries were major contributors of fecal coliform to 43 percent of prohibited and conditionally-approved estuarine waters. This finding should not go unnoticed since shellfish rely on freshwater input to estuarine and coastal waters to maintain the brackish conditions in which they thrive.

The Habitat Conservation Program activities are carried out nationwide as part of the fisheries management and research programs of NOAA's National Marine Fisheries Service (NMFS).

Several Federal laws provide NMFS with the authority to manage and conserve living marine resources and their habitats. Others require consultation between NMFS and agencies proposing actions that may affect these resources and their habitats. The most significant include the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Environmental Policy Act of 1969, and the Magnuson Fishery Conservation and Management Act of 1976.

Programs in the regional offices reflect three important considerations: 1) the pressures on the living marine resource habitats; 2) the size of the area managed; and 3) the value of the species including recreational, commercial and ecological. The habitat programs in each region respond to unique regional issues and geographic constraints.

Programs at the research centers and their laboratories address important resource issues. The Northeast Fisheries Center conducts research related to North and Mid-Atlantic offshore, coastal, and estuarine species and their habitats. Its laboratories study the effects of ocean dumping, petroleum development, industrial and domestic contaminants, and urban and industrial expansion on coastal and offshore fisheries, marine mammals, and endangered marine species.

The Southeast Fisheries Center concentrates on the effects of habitat degradation and loss on the estuarine and coastal ecology and food chains of the Gulf of Mexico and the South Atlantic. Much of its research involves the Gulf shrimp fishery which in 1982 was the single most valuable U.S. fishery.

The Southwest Fisheries Center's habitat activities include research on the striped bass fishery and the effects of contaminants, fishing activities, and natural events on the offshore and coastal fisheries of the region. Marine mammal research is also a key element of the program.

At the Northwest and Alaska Fisheries Center, investigations involve the effects of petroleum development, hydroelectric power development, logging, mining, and urban pollution on habitats and resources. Also, it examines the relationship between environmental contaminants and diseases of demersal fish. The National Marine Mammal Laboratory, a part of the Northwest and Alaska Fisheries Center, studies the habitats of marine mammals, especially whales and the northern fur seal.

In addition, the NMFS Habitat Conservation staff reviews proposals for projects regulated by other Federal programs including the Federal Energy Regulatory Commission's hydroelectric project licensing program, the Department of the Interior's Outer Continental Shelf accelerated leasing program, the Army Corps of Engineers' permit programs for ocean dumping and dredging and filling of wetlands and waterways, and EPA's National Pollutant Discharge Elimination System permit program. NMFS consults with these agencies to ensure that fish habitat is considered fully in the decision-making process.

Research Programs Administered By NOAA

Research on toxic contamination of the coastal ocean system is being conducted in NOAA's Office of Oceanic and Atmospheric Research through its Environmental Research Laboratories and the National Sea Grant College Program. The Pacific Marine Environmental Laboratory (PMEL) in Seattle has addressed environmental concerns associated with the reactions of marine systems to continuous influxes of contaminants in Pacific Northwest and Alaskan coastal and estuarine waters. Researchers as PMEL are examining the role of suspended particles in transporting heavy metals and organic pollutants and the mechanisms of removal of the contaminants by burial in sediments or advection from the estuary in dissolved form. As these processes become better understood, the long-term effects of chronic, low-level input of pollutants into the marine system will be assessable. The studies in the Puget Sound-Strait of Juan de Fuca estuarine system are leading to a better understanding of the ability of estuaries to accommodate pollutant inputs. In addition, several Sea Grant colleges are conducting studies on mechanisms of control of toxicants in estuarine systems such as Delaware Bay and Massachusetts Bay.

Major efforts are being made in the Great Lakes region by the Great Lakes Environmental Research Laboratory (GLERL) and several Sea Grant Colleges. GLERL has a continuing program in collaboration with EPA, the U.S. Fish and Wildlife Service (FWS) and various Canadian agencies to develop and improve our understanding of the processes that control the cycling and fate of organic contaminants. GLERL's program has focused on particle-dynamics, contaminant bioavailability and effects, and uptake by highly exposed bottom-dwelling organisms. Primarily regionally-focused Sea Grant college studies are also directed at the transport, cycling, fate and effects of toxic contaminants. This research includes work on trace metals and organic contaminants. The University of Wisconsin at Madison is the major Sea Grant college involved in these studies. They developed sophisticated models which can be used to judge the environmental hazard posed by various halogenated organic compounds.

Cooperative Activities with the U.S. Environmental Protection Agency

NOAA has had a long-standing, productive working relationship with the Environmental Protection Agency in dealing with specific problems in the coastal ocean. In the Spring of 1987, a working group was established jointly by my predecessor and the EPA Assistant Administrator for Water to plan NOAA-EPA cooperation under the Water Quality Act of 1987. This group, with participants from each of NOAA's line offices, as well as the NOAA Estuarine Programs Office, is making progress towards coordinating inter-agency activities under this Act. For example, since the early 1970's we have worked with EPA in characterizing alternative ocean waste disposal sites, including the area around what is now the 106-mile dump site. Our scientific activities produced results that provided much of the technical basis for EPA's decision to close the 12-mile site. Since 1982 we have worked with EPA's Office of Emergency and Remedial Response to provide scientific information useful for the cleanup of coastal Superfund sites. Over 40 percent of the sites on EPA's National Priorities List of almost 1,000 abandoned hazardous waste sites are located in coastal counties. We now have a NOAA Coastal Resource Coordinator and a NOAA scientist paid with Superfund monies working in each of the seven EPA regional offices that cover coastal areas.

Our cooperative work with EPA on problems of estuaries and near coastal waters is more recent, stimulated by amendments to the Clean Water Act and by EPA's National Estuary Program and Near Coastal Waters Program. We are working with EPA to provide the best scientific information available for implementation of various sections of the Clean Water Act. For example, NOAA provides to the EPA information required to conduct a national screening analysis of potential toxic contamination problems in estuaries. This analysis will be used to implement section 304(l). We have provided data on nonpoint source discharges of nutrients to coastal waters, and EPA has transmitted this information to its regional offices and 22 coastal States for implementation of its nonpoint source assessment program under section 319. We are currently working with EPA to identify major point sources discharges are candidate for regulation under section 403(c). We are working with EPA headquarters and its regional offices in the planning and implementation of programs in all individual estuaries of EPA's National Estuary Program, under section 320.

Conclusion

I will conclude by reemphasizing that the Nation's coastal ocean is not only a highly productive natural system -- of critical importance in sustaining the health and providing the habitat for most of our living marine resources -- but it is also used heavily by people for living, working and recreation. Cleaning up the coastal ocean and maintaining improved levels of environmental quality will take a long time. But assuring its continued good health is the most significant environmental quality problem that confronts us today. The coastal ocean is vital to the United States as a whole, and to numerous communities in every coastal State. Productive use of its resources contributes billions of dollars to the national economy.

While NOAA is identifying and mitigating threats to the resources of the coastal ocean, work remains to be done to fulfill NOAA's coastal ocean related statutory mandates. We're beginning to acquire the understanding that we need to do this effectively and efficiently. Through our coordinated actions we can regain, maintain and increase public confidence in our ability to increase knowledge for the intelligent management of this valuable resource.

This concludes my testimony, Mr. Chairman. I will be happy to answer any questions you have.

TESTIMONY OF
A. JAMES BARNES
DEPUTY ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

APRIL 20, 1988

Good morning. I am Jim Barnes, Deputy Administrator of the U.S. Environmental Protection Agency (EPA). EPA Administrator Lee Thomas and I share your concerns about the condition of our coastal areas and oceans, and I am pleased to have this opportunity to discuss our concerns with you. I will first discuss the problems in coastal environments and then address EPA's approach for dealing with these problems.

Environmental Problems in Coastal Ecosystems

It is clear that our coasts and oceans are experiencing growing stress. A number of highly publicized adverse events affecting some of our coasts last summer reminded us of the ongoing problems of toxics contamination, eutrophication, pathogens contamination, and habitat loss and alteration. They manifest the burdens that population growth and development are placing on a complex and vulnerable ecosystem.

Toxic contamination is an issue not just for our coasts. In addition to receiving pollutants from adjacent sources, estuaries and coastal waters also get the accumulated silt, toxic chemicals, pesticides, nutrients, and pathogens discharged from thousands of upstream sources. While these sources may not be significant individually, their aggregate impacts can be substantial.

Estuaries suffer because, due to their physical characteristics, they tend to trap and concentrate entering pollutants. Toxics such as heavy metals and synthetic organic chemicals have accumulated in such high concentrations in some sediments that they now contaminate the shellfish and bottom-dwelling finfish there, posing possible health and ecological risks for those who consume them. Toxics also have been linked to increased incidence of fish disease and may threaten the health, reproduction, and survival of many coastal species.

The recurring incidence of eutrophication is another major concern. Nitrogen and phosphorus are nutrients vital to plant growth, but when they enter the water in excessive amounts--from agricultural runoff or sewage treatment discharges--they promote larger than normal growths of algae that ultimately deplete the oxygen in the water column and hinder the growth of submerged aquatic vegetation. The lower the oxygen levels in the water, the fewer finfish and crustaceans it can support. The Gulf of Mexico takes in one-third of the nation's fish landings, yet in 1985 alone, 8,000 square kilometers of the Louisiana shelf went hypoxic. Extensive areas at the bottom of the Chesapeake Bay, Long Island Sound, the New York Bight, and Massachusetts Bay suffer in summer months from oxygen depletion which adversely effects fish and crustaceans.

We are also losing shellfisheries because of contamination by pathogens from sewage and agricultural wastes. Just in 1985, one-third of all our nation's productive shellfish areas were restricted or closed to harvesting because of contamination. In some places, sewage contamination in near coastal waters has also been responsible for outbreaks of hepatitis A and viral gastroenteritis among shellfish consumers. Even bathing beaches sometimes have to be closed for swimmers due to pathogens in the water.

Declines in fisheries and shellfisheries and other changes in living resources are also affected by the habitat destruction and increased development occurring in our coastal environments. We have been losing thousands of acres of coastal wetlands every year. Louisiana alone, for example, is estimated to lose 25,000 acres a year. To accommodate population growth, we are building roads through marshes, dredging, draining, and filling wetlands, and diverting essential freshwater flow from wetland areas.

By 1990--less than two years from now--we expect that 75 percent of the U.S. population will live within 50 miles of a coastline. Even now, the average population density of coastal counties is 343 persons per square mile, compared to 71 persons per square mile in non-coastal counties. In our desire to be close the water, we are slowly destroying some of the marvelous habitats and living resources that make it valuable to us.

Clearly, our coasts are bearing the brunt of increased populations. Nearly 30 percent of all major national pollutant discharge elimination system (NPDES) dischargers are located near coastal waters or the Great Lakes. Consequently, some 2,000 municipal sewage treatment plants and industrial facilities discharge into our estuaries and coastal waters, and, the effluent of thousands more upstream facilities enters indirectly through rivers and streams. Pollutants also enter coastal waters from combined sewer overflows, commercial shipping and recreational boating, oil and gas platforms, marinas, and naval and commercial port activities. Municipal sewage effluent and direct industrial discharges enter near coastal waters in particularly large amounts because of high population densities and heavy industry in coastal lands. EPA's NPDES program, which I will discuss later, has limited, and will continue to limit, the discharge of pollution from these sources.

Pollutants also enter from nonpoint sources such as farm and livestock runoff, lumbering, mining, urban and suburban runoff, failing septic systems, contaminated ground water, leachate from hazardous waste storage sites and landfills, and airborne pollution. These sources are far more difficult to control than point sources because they originate from a wide range of activities within the coastal drainage basin, which may cover large areas. The watershed that feeds the Chesapeake Bay, for example, stretches from the Mohawk Valley of New York in the north to the Appalachian Mountains in the west and as far south as North Carolina. The result is that even if all point sources were in perfect compliance with their permits, including advanced wastewater treatment, the pollutant loads entering our coastal waters would still be too much. As I will mention later in the testimony, EPA is now addressing these sources in the nonpoint source program established by the 1987 Water Quality Act.

Our challenge is to reduce or at least maintain current loads even in the face of increasing population. Coastal ecosystems are unique in their biological richness and their ability to support many beneficial uses, ranging from commercial and recreational fishing, aquaculture, tourism and waterfront development, ports and shipping, to ecological functions such as fish and wildlife habitat and nurseries for hundreds of diverse species. Yet the decline in our coastal environments is seriously threatening some of these uses. Near coastal waters fisheries account for billions of dollars per year and more than 70 percent of the total U.S. commercial fish landings; and, recreational fishing is a $2.4 billion a year industry. Unfortunately, however, we have already begun to see quantifiable economic losses from the decline or collapse of these industries, and the ripple effect of those declines on local economies.

For many coastal states, tourism and travel outrank any other industry in their economies, surpassing even manufacturing or farming. In 1985, for example, the National Park Service alone recorded 22 million visits just to national seashores. Another 60 million visits were recorded for adjacent areas. That same year, federal, state, and local governments spent some $5 billion to support and maintain recreational opportunities in coastal counties. Water-based recreation and tourism are second only to automobile production in Michigan's economy; for the Great Lakes as a whole, they generate an estimated $8 billion to $12 billion per year, and in New Jersey, tourism is the number one industry for the State. Last summer's pollution events did not help coastal economies dependent on swimming and beach activities, aesthetics, boating, and other water-based recreation.

The ecological value of coastal waters is indisputable. They provide critical habitat for a wide range of commercially and ecologically valuable species of fish, shellfish, birds, and other aquatic and terrestrial wildlife. About 85 percent of commercially harvested fish depend on estuaries and near coastal waters at some stage in their lifecycles. Near coastal waters are particularly important as feeding grounds for juvenile anadromous fish such as striped bass, salmon, shad, and sturgeon, as well as for young and adult fish and shellfish that spend their entire lives within 12 miles of shore. They also support the great bulk of the nation's clam, oyster, lobster, and mussel harvests, and 100 percent of blue crab, abalone, and bay scallops. Many species of wading birds and wildfowl depend on coastal wetlands and other near coastal habitats for food, breeding space, or migratory rest areas. Seals, sea lions, manatees, sea otters, and others live exclusively in near coastal areas.

And there are yet other impacts, unquantifiable perhaps, but equally as important, such as the loss of singular aesthetic experiences and the thoughtless destruction of unique and irreplaceable habitats and the species that inhabit them.

Response to the Problem

Federal, State, and local governments have passed legislation and established programs and regulations which are addressing coastal pollution problems. Virtually every source of near coastal water pollution is being addressed by at least one of EPA's Clean Water Act programs--from the construction grants for municipal sewage treatment to the National Estuary Program.

EPA has distributed over $44 billion in federal grants for the construction of municipal sewage treatment works; a large share of this went to build POTWs in coastal and estuarine areas or on rivers flowing to them. EPA's budget provides for continued funding, in the form of both outright grants until 1990 and capitalization grants through 1994 to establish State Revolving Loan Funds.

Also, while maintaining and enhancing our base programs of permitting, pretreatment, and enforcement, we have encouraged and implemented innovative approaches as well.

Our permitting, pretreatment, and enforcement programs under the Clean Water Act encompass nearly 300,000 national facilities and dischargers. In addition to 69,000 individually permitted dischargers, there are approximately 200,000 industrial facilities that send their effluent to municipal treatment plants. These facilities are required to pretreat their wastes to remove metals, organic chemicals, and other toxic pollutants because most municipal plants are not equipped to treat these substances. At least 5,000 other facilities are subject to general permits for offshore oil and gas facilities, animal feedlots, and construction activities. Finally, thousands of facilities require permits for various categories of discharges.

In managing these programs, we are developing flexible mechanisms that allow EPA and the states to target impaired water bodies, discharges with high potential to cause water-quality problems, and dischargers with poor compliance histories. This ranking process will allow states and our regional offices to focus on high-value water resources where there is actually or potentially a high degree of use for fishing and recreation, or where there are exceptional ecological values.

One of our priorities especially relevant to near coastal waters is to make the designation of "major" discharges even more sensitive to high-value waterbody considerations. This is important because discharges designated as major receive priority for both permitting and enforcement activities.

In our day-to-day NPDES operations, we are also making every effort to avoid backlogs of expired and often outdated permits. Six years ago, such backlogs had reached 46 percent for both EPA and the states. Although that percentage has been reduced to 10 percent, we are concerned that the backlogs in some coastal states were too high at the end of FY 1987. While expired permits are fully enforceable, they may not reflect current minimum control technology requirements for protection of receiving water.

Pretreatment is another essential element in our effort to control discharges of conventional and toxic pollutants. Of the 1410 local authorities implementing technology-based pretreatment standards, about one-third are in coastal states and another 25 percent are in Great Lakes states. Since recent data indicate that toxic impacts on receiving waters due to discharges from POTWs are more significant than we first thought, we are increasing our focus on establishing water quality-based limits for toxics in NPDES permits for municipal dischargers.

Compliance with NPDES permits is assessed primarily through permittee self-monitoring and reporting, as well as EPA and State inspections. To help the States and our regional offices track compliance, we have developed the computerized Permit Compliance System (PCS), which can flag effluent, schedule, and reporting violations. Since 1984, EPA has taken judicial action against industrial and municipal facilities in such coastal areas as Maryland, Puerto Rico, Florida, Louisiana, Texas, California, Alaska, and Indiana.

Also since 1984, the National Municipal Policy has been one of the Agency's top priorities. Due to the poor performance of thousands of POTWs in meeting the original 1977 compliance deadlines, EPA and most of the States began an enforcement effort intended to achieve complete municipal compliance by July 1, 1988.

This policy affects nearly 1500 major POTWs. As of March of this year, about 550 had achieved physical compliance with their permits, another 650 are on construction schedules established by EPA or State administrative orders or permits, 140 are under federal or State judicial orders, and another 140 have been referred for judicial action by EPA or the States. Only 20 facilities are not yet on schedule or referred, pending resolution of advanced treatment issues on marine waiver applications that could affect their permit requirements. In the majority of cases against large municipal facilities, EPA has assessed significant penalties for past violations.

In terms of industrial users, EPA has also concluded several law suits against a number of Chrysler, General Motors and Modine Manufacturing facilities, as well as against 28 electroplaters and metal finishers in the New York/ New Jersey metropolitan area. This initiative appears to have resulted in extensive voluntary compliance elsewhere. In California, working with State and local governments, we launched enforcement initiatives in Los Angeles, and San Francisco--both areas with large numbers of industrial users that could affect coastal waters. In late 1986, USM Corporation in New Bedford, Massachusetts pled guilty to a 41-count criminal indictment and paid a fine of approximately $1 million.

As you can see, EPA is aggressively maintaining its base programs, and enforcing permit compliance and pretreatment requirements where necessary.

At the same time, we have also begun to look at new approaches for solving water-quality problems. The Office of Marine and Estuarine Protection was created precisely because we recognized the need to focus on coastal and ocean issues. More recently, the Agency has identified near coastal waters and the protection of critical aquatic habitats as a priority concern in its guidance to EPA regions and to the States for both FY 1988 and FY 1989. Our budget reflects this priority in terms of funding and staffing, and we are helping our coastal regional offices to prioritize more of their resources specifically to near coastal waters problems.

As you know, the 1987 Water Quality Act broadened the scope of EPA's programs to address the issues of nonpoint source pollution, surface water toxics, and protection of critical aquatic habitats such as wetlands and estuaries. Congress gave us some general principles for focusing on these new programs: conduct assessments, set priorities, involve others, and establish multi-year water quality objectives. We are using these principles, combined with our own successful experiences in Chesapeake Bay, the Great Lakes, and several estuaries, to develop the concept of State clean water strategies. We believe these strategies will give States the flexibility to set priorities and focus on special aquatic concerns such as estuaries, key watersheds, or nonpoint sources; will encourage stronger links among State programs and with other federal/State agencies; and will enlist grass roots support for both action and funding. Further, these strategies should lead to watershed or geographic-based approaches which focus the tools and resources of several programs on specific waterbodies and provide a better mesh between ongoing clean water programs and these new problems.

An example of a geographic/site specific approach to managing waterbodies is our national estuary program. Currently, EPA has selected six estuaries to be in the program. These are Buzzards Bay in Massachusetts, Narragansett Bay in Rhode Island, Long Island Sound in Connecticut and New York, Albemarle/Pamlico Sounds in North Carolina, San Francisco Bay in California, and Puget Sound in Washington State. We expect that the program will expand to include up to a total of about 12 estuaries of national significance by the end of FY 1988.

Three characteristics distinguish EPA's approach to addressing pollution in estuaries. First, we target basin-wide assessment of problems and causes. Second, we integrate the use of all available regulatory tools and cleanup techniques addressing point source pollution, nonpoint source pollution, land-use management, and coastal resource protection; an example of this procedure is EPA's program to establish requirements for storm water discharges. We will be working closely on this effort, under which a considerable number of coastal municipalities will need to obtain permits and minimize pollution from their storm water discharges.

Finally, our approach incorporates collaborative problem solving that includes, and utilizes the resources of all relevant federal, State, and local government agencies as well as public interest and user groups. We provide the technical expertise and the organization umbrella to bring together all the parties affecting and affected by near coastal water quality.

This can be tedious and contentious process. There is no easy way to mesh the interests of fisheries groups, scientists, developers, citizens, farmers, and a whole range of other parties whose actions affect a body of water. But it has to be done and it can be done. We have learned from our Great Lakes program and our Chesapeake Bay program that it is possible.

In our Gulf Initiative, we are expanding on this process to integrate the interests of two different EPA regions, five different States, a host of interest groups, and hopefully, eventually, two countries. Similarly, the New York Bight restoration project will involve looking at all the sources of pollution in the Bight, and determining how to eliminate them and at what cost. And last month, we launched three Near Coastal Waters pilot projects to demonstrate innovative management techniques for addressing coastal environmental problems.

For the long term, we are working to improve the scientific basis of marine/coastal decision making, including developing improved criteria for evaluating the quality of estuarine waters and sediments, assessing the exposure of living resources to toxic pollutants, developing methods for quantitative ecological risk assessments, and preparing additional guidance on assessing human health risks from chemically contaminated fish and shellfish.

State and Local Responsibilities

EPA can not, and should not, do it all--or even most of it. One major role that EPA can play is that of a facilitator or coordinator of the various government levels and agencies that need to address the coastal and estuarine problem. For example, we have initiated a new "technology transfer" effort to provide crucial technical and management information to State and local decision makers. I believe this effort will be a key element in disseminating the innovative and effective management techniques and in encouraging decision makers to share their own successes with others.

This technology transfer effort is even more important for the long run. The really critical decisions and choices lie at the local and State levels, where issues of growth, land-use, and zoning have always been resolved. EPA and the other federal agencies can provide the leadership and technical assistance to help local communities to make informed and deliberate choices. We can promote innovations and focus resources. But the political and institutional will to protect the resource must come from the States and be grounded in local communities.

Let me offer an example of the need for local will. The Chesapeake Bay's combination of agricultural interests, severe pressure for unimpeded coastal and beachfront development, and critical aquatic habitats confronts local officials with the full range of problems faced by almost any estuary or coastal community in the country. Waterbody management, and specifically the estuary program, offers communities an opportunity to approach their environmental future in an integrated fashion. In Maryland, the elected officials and communities confronted reality head on, and the result was the precedent-setting critical areas plan. Prohibiting or severely regulating development within 1,000 feet of the entire Maryland shoreline, the critical areas program is probably disliked by many affected property owners in the State. But it passed, because there was a massive effort to explain to the public what the plan was, how it would affect people, and what it meant in terms of protecting the Bay. It was, indeed, a tedious process, involving the public at every possible opportunity; that is what it takes.

In another effort to increase the involvement of the public in making environmental decisions, EPA last fall sponsored, and I spoke at, a conference by Save the Bay, a successful, non-profit citizens organization in Rhode Island. Save the Bay's Executive Director Trudy Coxe is here today to testify. The conference brought together a host of environmental activists who began working together to exchange information on public involvement techniques, allowing advances in one part of the nation to help groups elsewhere. The conference also allowed participants to discuss the status of coastal environmental problems and to identify and recommend solutions to those problems.

1987 dismayed us with its examples of an environment in stress, but it also gave us two programs that translated public dismay into viable political and institutional commitments to protect a resource.

Even before summer last year, New Jersey had begun to build on its citizens' rising concern about their coastline and its economic role as the State's major tourist attraction. The New Jersey 14-Point Plan proposed to commit $220 million of State money for programs ranging from simple street sweeping to major facility construction and enforcement of permit and pretreatment requirements. It also complemented other hard decisions to closely regulate growth in sensitive areas and to require recycling throughout the State. Governor Kean's plan recognizes that the sources of coastal and estuarine pollution are diverse and complex, and that the solution will require substantial amounts of money, long-term political commitments, and a continuing emphasis on a variety of management measures and regulatory programs.

Similarly, the 1987 Chesapeake Bay Agreement was the result of public demand that a regional treasure be restored. The same process that yielded the critical areas commission also enlisted support for a new, more specific agreement among Maryland, Virginia, Pennsylvania, and the District of Columbia to govern their activities affecting the Bay. The 1987 agreement identified priority goals to protect the Bay and negotiated commitments and schedules for achieving those goals, which include:

- by the year 2000, reducing by 40 percent the nutrients discharged to the Bay--a commitment requiring major investments in facility construction and sophisticated treatment and/or implementation of highly-effective non-point source control programs.
- the recognition that development and uncontrolled population increase in coastal areas is one of the major causes of coastal degradation. The agreement calls for the adoption of policies designed to anticipate and reduce the adverse effects of over-development.
- development of a unified, Bay-wide public information, communication, and participation plan to encourage a greater sense of public "ownership" of the Bay and respect for its ecological limits.

A wonderful little book--the Bay Book--was produced by a consortium of Maryland State and citizen groups. I recommend it for every community. It shows that individuals can make a significant difference just by simple choices in their everyday lives.

TESTIMONY OF DR. HOWARD LEVENSON

OFFICE OF TECHNOLOGY ASSESSMENT
U.S. CONGRESS

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ON

PROTECTION OF U.S. ESTUARIES AND COASTAL WATERS

April 20, 1988

Mr. Chairman:

Thank you for the opportunity to testify today. My name is Howard Levenson. I was the project director for the Office of Technology Assessment's study, *Wastes in Marine Environments*, which was initiated at the joint request of the House Committees on Merchant Marine and Fisheries and Public Works and Transportation, and endorsed by the Senate Committee on Commerce, Science, and Transportation. The final report was released on April 28, 1987.

The OTA report addressed the management of wastes that are or could be disposed of in marine waters, including municipal wastewater and sewage sludge, industrial wastewater, dredged material, and other industrial wastes.[1] Moreover, OTA placed marine waste disposal within a broader context, by looking at other land-based sources of marine pollution (i.e., by comparing pollution from disposal with pollution from agricultural and urban runoff), and by discussing marine pollution issues in light of our general approach to waste management.

Today I would like to discuss OTA's major finding about the Nation's estuaries and coastal waters:

> Without additional protective measures, the next few decades will witness new or continued degradation in many estuaries and some coastal waters around the country, even in some that exhibited past improvements.

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[1] Other OTA reports address the management of hazardous wastes: *Serious Reduction of Hazardous Waste*, September 1986; *Ocean Incineration: Its Role in Managing Hazardous Waste*, August 1986; *Transportation of Hazardous Materials*, July 1986; *Superfund Strategy*, April 1985; *Protecting the Nation's Groundwater from Contamination*, October 1984; and *Technologies and Management Strategies for Hazardous Waste Control*, March 1983.

After describing some of the effects observed in these waters, I will discuss the adequacy of current management efforts, place marine waste disposal in a broader waste management context, and discuss moving towards environmental planning to protect estuaries and coastal waters.

This is an opportune time to address the quality of the Nation's estuaries and coastal waters. Marine environments have been used for years by coastal communities and industries for the disposal of various wastes.[2] This disposal has been relatively cheap and has solved some short-term waste management problems.

The overwhelming majority of marine disposal has occurred near shore, in our estuaries and coastal waters. These waters, of course, are among the most important of all marine environments, with respect to their ecological roles, commercial resources, and recreational uses. They provide critical habitat for numerous organisms, including some endangered species; and they support commercial and recreational fishing, swimming and boating, and other activities generated by tourism. For example, commercial landings of fish and shellfish from all U.S. marine waters have a dockside value of well over $2 billion and a retail value several times greater; about one-half of this total is generated by harvests from within 3 miles of shore.

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[2] Waste disposal activities include: 1) the discharge through pipelines of industrial and municipal wastewaters; and 2) the dumping from boats or barges of sewage sludge, dredged material, and other wastes (e.g., acid-iron industrial wastes, seafood processing wastes). Discharges and dumping are commonly called point sources. In contrast, nonpoint sources include runoff caused by precipitation on land surfaces (e.g., agricultural and forest lands, urban streets and construction sites), underground trasnport through groundwater aquifers, and atmospheric deposition.

But estuaries and coastal waters are fragile and highly complex, and they can be damaged by our activities. Fishermen, the general citizenry, towns, and county and State governments have grown increasingly concerned about waste disposal in marine waters and its effects on harvests and tourism and on the property values of real estate located near these waters. Concerns heightened in 1987, subsequent to the release of OTA's report, when several discrete incidents galvanized public and government attention. These included the infamous barge of municipal solid waste that wandered to three countries before returning to New York; the deaths of hundreds of dolphins along the east coast (the ultimate cause of which has yet to be determined); and, during the summer tourist season, the washing ashore in New Jersey of illegally dumped hospital wastes.

OBSERVED EFFECTS, AND SOURCES AND AMOUNTS OF POLLUTANTS

Pollutants from disposal activities and from runoff have resulted in a wide variety of adverse effects on water quality, sediment quality, marine organisms, and even humans. In general, many estuaries and coastal waters around the country have suffered significant adverse effects, although the overall trend during the last 10 to 15 years has been mixed. Some areas that once exhibited severe degradation have improved, but noticeable deterioration continues to occur or is accelerating in many other areas.

The general types of adverse effects observed in estuaries and coastal waters include:

- effects on water quality -- excess levels of nutrients, low levels of dissolved oxygen, turbidity;
- loss of submerged aquatic vegetation;
- effects on fish, shellfish, birds, and mammals -- accumulation of toxic chemicals, disease and abnormalities, reproductive failure, mortality;
- effects on entire marine communities -- population declines, changes in species diversity;
- closures of beaches and shellfish grounds, because of contamination with microorganisms or toxic chemicals;
- rising incidence of reported human disease, from consuming contaminated shellfish or swimming in contaminated marine waters; and
- accumulation of toxic pollutants in the microlayer and in sediments.

The extent of this degradation varies greatly around the country. Public attention has focused mostly on the northeastern United States (e.g., the Chesapeake Bay and the New York Bight), southern California, and Puget Sound. The latest evidence from the Chesapeake Bay, for example, suggests that high levels of toxic metals and organic chemicals may be widespread in the microlayer (a thin layer of surface water that harbors large numbers of eggs and larvae). In addition to these areas, however, less-publicized serious effects also have occured or are beginning to occur in the less-studied Gulf of Mexico and along the southern Atlantic coast.

OTA concluded that on a national scale, industrial and municipal pipeline discharges are at least as important as dumping in contributing pollutants and causing damages to marine resources. In addition, runoff (a major form of nonpoint source pollution) from agricultural lands and urban areas -- although not classed as a disposal activity -- also contains large amounts of certain pollutants and enters marine waters in large quantities.

The importance of a particular source of pollutants can vary dramatically from one area to the next. In many waterbodies, runoff is the leading cause of degradation. In others, pipeline discharges of one sort or another are more important. Pollutant inputs from dumping appear to be relatively minor in most estuaries and coastal waters, but they can be significant in some areas; the most extreme example of the latter situation is probably the New York Bight. Information about pollutants from atmospheric deposition into marine and fresh waters is limited, but recent studies in the Great Lakes indicate that it may be significant.

In addition to these sources, the actual physical nature of estuaries and coastal waters can be radically altered by filling of wetlands, diversion or channeling of rivers, and development of shoreline property.

THE ADEQUACY OF CURRENT MANAGEMENT EFFORTS

Two statutes form the basis of most Federal regulatory efforts to combat marine pollution: the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Clean Water Act (CWA). The MPRSA regulates the dumping of waste material in coastal and open ocean waters, while the CWA has jurisdiction over pipeline discharges in all marine waters, dumping in estuaries, and (theoretically) runoff.

The MPRSA relies to a great extent on various considerations of marine environmental quality. The act establishes a permit system for the transportation and dumping of waste materials. Applications for permits are reviewed on the basis of nine ocean dumping criteria, which include the effects of dumping on human health and marine resources, as well as the need for the proposed dumping. The MPRSA also implements the provisions of the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (known as the London Dumping Convention); for example, it adheres to the convention's lists of regulated substances.

The CWA uses control strategies based on both "technology-based" emission standards and "water quality-based" standards. The technology-based approach attempts to do the "best" job of removing pollutants from a discharge, usually by employing certain treatment technologies; it does not consider pollutant levels in the actual receiving water. In contrast, the water quality-based approach directly considers the ambient conditions of the receiving water. It involves designating desired "uses" and developing site-specific, numerical water quality standards for a waterbody; the numerical standards establish the levels of particular pollutants -- in terms of concentrations in the water, not in the discharge itself -- that cannot be exceeded without impairing the designated uses.

During the last 15 years, the cornerstone of the two major CWA programs that regulate pollutants in pipeline discharges -- the National Pollutant Discharge Elimination System and the pretreatment program -- has been the technology-based approach, which is much easier to implement than the water quality-based approach.[3] However, the water quality-based approach has always been considered an additional tool to be used in control efforts, and recently its use has been given more emphasis.

The pollutant control programs under the CWA and the dumping criteria and permitting procedures under the MPRSA have helped reduce the amounts of pollutants entering marine waters. Under the CWA, the construction or upgrading of municipal sewage treatment plants has improved conditions in some estuaries and coastal waters -- most notably, by decreasing excess inputs of nutrients (such as phosphorus) and increasing oxygen levels. The Federal government has contributed over $44 billion to this effort during the past 15 years. The CWA also has succeeded in reducing the levels of some toxic metals and organic chemicals in industrial discharges into marine waters. The MPRSA, despite the continuing controversy over the dumping of municipal sewage sludge, has been effective in regulating dumping in coastal waters and the open ocean; in particular, the dumping of industrial wastes has declined dramatically since the early 1970s.

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[3] The water quality-based approach requires enormous amounts of information about ambient water conditions, the extent of adverse effects, and the relationship between specific pollutants and marine organisms. It also requires continuous monitoring and the development of site-specific criteria for many pollutants. These difficulties were a major reason behind the 1972 shift toward the technology-based approach.

However, these provisions have not adequately protected some estuaries and coastal waters from degradation. OTA's analysis of this situation focused on the CWA, because it is the primary statute covering pipeline discharges and runoff -- the two most important sources of pollutants entering estuaries and coastal waters. Only partial implementation of the CWA has been achieved to date, and the prospect of achieving full implementation and enforcement is unlikely -- partly because the Environmental Protection Agency (EPA) and the States do not have adequate resources to monitor and enforce all regulations, and partly because the immense number of permitted facilities requires EPA and the States to rely on self-monitoring information received from the permittees themselves.

Moreover, even with total compliance, which is unlikely, existing CWA regulations will not be sufficient to maintain or improve the health of all estuaries and coastal waters. This is because:

* current CWA programs do not address all important toxic pollutants and sources of these pollutants;
* current CWA programs do not adequately address runoff;

- Federal resources for sewage treatment are declining, and the ability of States and communities to fill the breach is uncertain; and
- pipeline discharges and urban runoff will increase as population and industrial development expand in coastal areas.

For example, entire categories of industrial dischargers -- such as printing and publishing facilities, and hazardous waste treatment, storage, and disposal facilities -- either have been exempted from CWA regulation or were not on the original list of primary industrial categories to be regulated. Best available technology (BAT) standards for two significant industrial categories (pesticides; and organic chemicals, plastics, and synthetic fibers) and pretreatment standards for some categories (such as textile mills and plastics molding and forming) have not been promulgated.

Many organic chemicals on the CWA list of 126 priority pollutants are not regulated for technological or economic reasons (e.g., phthalates generated by the plastics molding and forming industry). In addition, other toxic pollutants that are not on the list of priority pollutants are sometimes present in significant quantities in discharges.

With regard to municipal treatment plants, EPA estimates that an additional $75 billion to $100 billion in local, State, and Federal investments is needed to meet the treatment requirements of the CWA.[4] The 1987 Water Quality Act authorized an additional $18 billion in Federal funding for such construction and for the development of State revolving loan funds, with funding ending in 1994. It is unclear whether States or communities will be able to fully fund remaining needs.

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[4] In 1984, EPA estimated that about $110 billion would be required by the year 2000 to meet remaining municipal treatment needs. Under the Construction Grants Program, the Federal share of these needs would have been about $36 billion. EPA recently lowered its estimate of remaining needs to $76 billion by the year 2005, although some State officials criticized the estimate as not reflecting all treatment needs.

VIEWING MARINE WASTE DISPOSAL IN BROADER CONTEXT

These problems stem partly from the fact that the United States has not developed a pollution control strategy capable of simultaneously considering multiple environments, types and sources of pollutants, and exposure pathways. For example, the pollutant control programs established by the environmental statutes of the past two decades -- including the MPRSA and the CWA -- each tend to focus on abating pollution in one particular environment (water, land, or air). While such programs represent a reasonable first step in approaching pollution problems, they sometimes result in the shifting of wastes from one environment to another. The laudable reduction of conventional pollutants in municipal sewage effluent, for example, has also resulted in rapidly increasing amounts of sewage sludge.

In recent years, consensus has developed about the need for a more comprehensive waste management strategy in the United States. In particular, many observers have concluded that some pollution problems, including those in marine waters, might be alleviated if policy choices about waste disposal were made within the context of a hierarchy of preferred waste management strategies. The tiers in this idealized hierarchy include:

* reducing the amount and toxicity of waste generated in the first place (using techniques such as product substitution and process modification);
* beneficially using or recycling any waste that is produced; and
* when reduction and recycling are not possible, choosing treatment or disposal options that cause the least damage to the environment and human health and that are acceptable to society at large.

OTA explicitly recognizes the importance of waste reduction and recycling.[5] Clearly, to the extent that fewer wastes are generated or that wastes are used for beneficial purposes, the need for waste disposal in different environments can also be reduced. If maintaining or improving the health of estuaries and coastal waters is desired, then reducing or recycling the wastes now disposed of in these waters would help. Indeed, municipal effluent can be used for irrigation or to recharge groundwater aquifers, and household systems that generate less wastewater are commercially available.

In general, though, neither the public nor the private sector has devoted enough attention to waste reduction and recycling. And even with extensive efforts towards these ends, it is likely that large amounts of municipal wastes, industrial wastes, and dredged material will continue to require disposal for the foreseeable future. These wastes will continue to contain organic chemicals, metals, and pathogens -- thereby limiting possibilities for their beneficial use.

MOVING TOWARDS ENVIRONMENTAL PLANNING TO PROTECT ESTUARIES & COASTAL WATERS

Three different, but not necessarily exclusive, strategies might help to maintain or improve the health of our estuaries and coastal waters. One strategy deals with the current system under the CWA. Briefly, this system could be improved by increasing enforcement, completing the promulgation of long-overdue regulations (e.g., for the pesticide industry), and expanding controls to cover a broader range of toxic pollutants and industrial sources. This approach alone will likely be sufficient in some areas, but it will require a combination of continued Federal, State, and local investments in enforcement efforts; monitoring and research, for purposes of enforcement and evaluating long-term trends; the construction of municipal treatment plants; and regulatory development. Improving the current system under the CWA will help in many areas, but because current CWA programs simply do not address problems such as runoff and increasing development, there are many other areas where additional efforts will be needed.

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[5] See, for example, *Serious Reduction of Hazardous Waste* and *Wastes in Marine Environments*.

A second strategy is to move disposal away from of estuaries and coastal waters. Such a strategy, however, may be technically difficult to implement and may conflict with laws and policies regarding disposal on land or in the open ocean. For example, it is physically unreasonable to extend most pipelines beyond estuaries and coastal waters, especially on the east and Gulf coasts. Furthermore, shifting pipeline discharges (even where technically feasible) and more dumping to the open ocean would counter current policies that restrict open ocean disposal.

Some disposal activities might be moved to land. For example, uncontaminated sewage sludge can be used to fertilize farmland and forestland, and uncontaminated dredged material can be used to replenish beaches. But over 90 percent of all sewage sludge generated in the U.S. already is managed or disposed of on land. Developing new sites or programs for the land-based disposal of sewage sludge, dredged material, and some industrial wastes is increasingly difficult because of public opposition and local, State, and Federal regulatory restrictions. In addition, land-based disposal of wastes such as municipal effluents is somewhat limited by cost considerations.

A third strategy suggests that the nation move towards "environmental planning." The idea behind this derives from basic ecological principles; it has been embodied in significant international documents such as the United Nations Environment Program's "Protection of the Marine Environment Against Pollution from Land-Based Sources" (known as the UNEP Montreal Guidelines).[6] Specifically, environmental planning envisions management that uses a broad, ecosystem-oriented planning approach -- i.e., on a watershed, drainage basin, or waterbody basis -- and that considers the full range of degrading activities, disposal or otherwise. This type of strategy seems particularly appropriate for the many estuaries and coastal waters that OTA's analysis suggests will require additional forms of management.

The Federal government and some States have already recognized this need in some areas and have developed management programs with an environmental planning orientation to attack site-specific problems that cannot be handled by existing programs. The Chesapeake Bay Program (a joint effort of EPA and several States) and the Puget Sound Water Quality Authority (a State program) are two of the most successful programs.

These individual management programs attempt to bring together all appropriate parties (including ones with authority to address land-use and runoff issues), identify the most important problems and their causes, and devise a management plan to alleviate those problems. In essence, they use environmental planning on an ecosystem basis to establish site-specific goals and select the most environmentally and economically effective means of achieving those goals. They seem more likely to succeed if the goals are tangible (e.g., restoring a specified percentage of shellfish beds) and if public and political support is substantial.

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[6] International organizations also are beginning to recognize positive links between environmental protection and sustainable development. The World Commission on Environment and Development report released last year, for example, concluded that environmental protection and sustained, equitable development are not antithetical principles; instead, the report highlighted the intimate links between these two goals.

These and other ongoing State and Federal institutional activities can certainly serve as models for identifying problems in waterbodies and developing management plans. The Puget Sound Water Quality Authority and Chesapeake Bay Programs are leading examples. Another potentially important example at the State level is the newly-created New Jersey Coastal Commission. At the Federal level, relevant activities and mechanisms include:

- The Water Quality Act of 1987, which authorizes the National Estuary Program;
- The Coastal Zone Management Act, which encourages States to develop management plans for estuaries, bays, and harbors that balance economic development and environmental protection;
- EPA's initiative on Near-Coastal Waters; and
- Sections 208 and 303(e) of the CWA, which provide for State development of area-wide or watershed management.

The National Estuary Program and the Near-Coastal Waters initiative are closely linked. Under the National Estuary Program, EPA is authorized to convene management conferences for individual estuaries; Congress has designated 11 estuarine waterbodies that should receive priority consideration in EPA's plans. Thus far, Buzzards Bay, Albemarle-Pamlico Sounds, Puget Sound, Narragansett Bay, and San Francisco Bay have been designated. In the Near-Coastal Waters initiative, EPA is funding projects in three areas (Delaware, Oregon, and Alabama/Florida) to test pollution management techniques in coastal waterbodies. The intent in both programs is to stimulate and provide models for State planning.

The Water Quality Act also authorized EPA to administer: (1) a toxic "hot spots" program, in which States are to identify waters not expected to meet water quality standards because of toxic pollutants in discharges; and (2) a nonpoint source pollution program, in which States are to identify waters not expected to meet water quality standards because of such pollution and submit a management program to EPA. In December 1987, EPA began issuing guidance documents to help States meet the requirements of these programs. However, these guidance documents do not carry the authority of formal regulations, and Congress did not appropriate money for the nonpoint source program. Nevertheless, some States are developing nonpoint source pollution programs on their own.

Most recently, Senator Mitchell introduced S. 2068, which would establish 10 multi-state, regional research centers around the country. The intent of this bill is to build on existing marine research institutions and provide for regional planning, coordination, and conduct of marine scientific research. Along with established programs such as NOAA's National Status and Trends Program, coordinated regional research will be critical in helping to identify and understand site-specific problems and in monitoring progress towards rectifying those problems.

WHAT NEEDS TO BE DEBATED?

These activities and mechanisms indicate that sufficient authority to develop and implement site-specific waterbody management where needed may already exist, and that major new legislation may not be needed. However, we still must ask how many "needy" estuaries and coastal waters will actually receive additional management, and especially whether existing local, State, and Federal mechanisms can be coordinated to provide effective management.

While site-specific, integrated planning appears promising, State and/or Federal programs based on such an approach do not exist for most estuaries and coastal waters. The development of regulatory tools that can be used to implement an environmental planning approach has been extremely limited (e.g., marine water quality-based standards, particularly for metals and organic chemicals). Even less attention has been given to developing and using additional measures of environmental health, such as habitat quality, sediment quality, and diversity, within a regulatory scheme.

Moreover, some potentially critical links are missing: an overall guiding philosophy specifically oriented to estuaries and coastal waters, and a system for deciding when and how to provide additional, site-specific management (either to reverse degradation or to prevent it from occurring in the first place). Without these, several important questions about the relative roles of Federal, State, and even local governments must be raised:

* will enough programs be developed and implemented?
* what about areas lacking active citizen groups or State agencies?
* is a national effort to identify "needy" waterbodies required?
* is a national program to stimulate development of plans needed?
* should national guidelines for such plans be issued?

In light of these questions, an ongoing experiment being conducted in Canada may be worth watching. Environment Canada (which includes the federal agencies responsible for pollution, fisheries management, and national parks) is debating the need for and nature of a national framework to aid in preventing and resolving marine environmental protection problems. This debate is taking place within the context of existing Canadian legislation, the UNEP Montreal Guidelines, and other international agreements to which Canada is a signatory, and it addresses the types of questions listed above.

If the U.S. follows this example and explicitly debates whether a more formal system is needed, OTA suggests that such a system need not require a Federal effort to develop and administer site-specific plans. Rather, the Federal role could be to provide more direction, both in overall philosophy and in identifying needy waterbodies and bringing appropriate parties together -- that is, in facilitating the systematic development of site-specific management plans. In their current forms, neither the National Estuary Program (NEP), which has limited ability to systematically address marine pollution problems, nor the Coastal Zone Management program will provide these services. However, EPA is steadily developing the NEP's institutional capabilities, which could lay a base for future expansion of the NEP's role.

These are questions that concern processes, institutions, and money, and the best responses are not clear. Whatever form the responses take, success in protecting estuaries and coastal waters will depend on several factors: (1) involving the public for long periods; (2) getting the many responsible agencies to cooperate; and (3) providing sufficient money, but only if it addresses the most important problems. Success will also require local and State regulators to make very difficult decisions about land-use issues and coastal development practices. For all of these reasons, all levels of government need to consider consolidating some of their existing and sometimes disparate efforts and providing clearer direction.

Moreover, our marine environmental pollution problems cannot be solved in isolation. Without greatly increased efforts to reduce and recycle wastes, continued protection in any environment will be difficult. Success in any of these endeavors will not be achieved overnight -- in some cases, the time scales may be 50 years or more. Without such efforts, however, we are likely to witness considerably more degradation of our estuaries and coastal waters.

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April 20, 1988

Statement of Clifton Curtis
On Behalf of
The Oceanic Society
Before the
Subcommittee on Environmental Protection
of the Senate Committee on Environment and Public Works
Concerning
Environmental Conditions and Trends
in Marine and Near-Coastal Waters

I am Clifton Curtis, President of the Oceanic Society. The Society is a 45,000 member non-profit organization dedicated to protecting the oceans for the people and wildlife that depend on them for life, livelihood and enjoyment. Through education, research and conservation, the Society promotes understanding and stewardship of marine and coastal environments.

I appreciate the opportunity to testify today at this oversight hearing as your Subcommittee examines the seriousness and extent of threats to the environmental quality of marine and near-coastal waters, and the adequacy of governmental and non-governmental initiatives and responses. This hearing provides an invaluable and timely opportunity to "sound the alarm," to educate decision makers and the public, at large, and to compel actions that are needed to protect, conserve and restore our marine and near-coastal waters.

The oceans, though vast and covering over seventy percent of our planet, are a vulnerable and complex environment. Numerous unique and important species live in or depend upon the oceans. The oceans are this planet's primary life-support system. They provide most of our oxygen, moisture and weather patterns. We count on the seas for food, trade, recreation and commerce. Without healthy oceans, life as we know it would end.

Yet, as discussed in more detail in subsequent portions of my testimony, there is substantial and growing evidence which shows that ocean and coastal resources are being mismanaged and abused. Far too often, decisions involving these resources are made to benefit narrow, short-range special interests, with disregard for or inadequate scientific understanding of potential adverse, long-term consequences. In recent years there has been an alarming increase in the degradation of near-coastal waters, where

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marine life is more plentiful. Much less is known about the deeper ocean, but there are strong signs of damage there, too.

International Perspective

Before focusing on marine and coastal problems facing the United States, I'd like to mention a very special recent report that presents a compelling global perspective. Last year, the World Commission on Environment and Development published the results of a special four-year study titled, Our Common Future. In preparing that report, leaders from twenty-one nations around the globe, including Norway's Prime Minister, Gro Harlem Brundtland as chairperson, and William Ruckelshaus as the U.S. representative, were charged with the task of proposing long-term environmental strategies for achieving sustainable development to the year 2000 and beyond. The Commission was asked to recommend cooperative actions between developed and developing countries, emphasizing the relationships between people, resources, environment and development.

Among a wide range of topics, Our Common Future addresses ocean issues in a chapter titled, "Managing the Commons." In that chapter, there is a call for action premised on findings that "[t]oday, the living resources of the sea are under threat from over-exploitation, pollution and land-based development." While their mandate was far broader than ocean-related matters, nonetheless Our Common Future states that (p. 265):

> Looking to the next century, the Commission is convinced that sustainable development, if not survival itself, depends on significant advances in the management of the oceans. Considerable changes will be required in our institutions and policies and more resources will have to be committed to oceans management.

The report proposes a number of measures to improve ocean management, including strengthened controls for ocean disposal of hazardous and nuclear wastes, improved fisheries management, reinforcing cooperation in semi-enclosed and regional seas (like the Gulf of Maine and the Gulf of Mexico), and efforts to advance and bring into force the Law of the Sea Convention that was opened for signature in 1982.

The Oceanic Society strongly endorses the findings and recommendations on ocean issues that are elaborated in Our Common Future. In order to respond to the Commission's concerns about "survival itself" on this planet in the 21st century -- only a few years away -- concerted action is needed, now.

As we all know, the only boundaries that our ocean ecosystem knows are human-created political ones, and these cannot prevent the spread of pollution. Therefore, each nation -- acting on its own and through such international arrangements as the Law of the Sea Convention, which merits ratification by the U.S. and entry into force as soon as possible -- has a responsibility to protect the oceans from abuse and overuse, and a corresponding interest and right to see that other nations do the same.

National Perspectives

A. National Studies and Reports

It is a privilege to participate in this hearing along with Trudy Coxe, Executive Director, Save the Bay, Inc. The Oceanic Society, and all of us who care about our oceans and coastal resources, are indebted to her organization for the lead role they played in convening a national conference last October that resulted, in part, in a comprehensive report titled Saving our Bays, Sounds and the Great Lakes: A National Agenda that is being released today. My organization, and many other conservation groups, participated in Save the Bay's national conference, and we wholeheartedly endorse the report's findings and recommendations, including the five-point "National Agenda" for action that Ms. Coxe will be highlighting in her presentation.

Within the Federal government, several reports prepared in recent years by agencies represented at this hearing reinforce the findings and recommendations contained in Save the Bay's report. In 1985, the Environmental Protection Agency initiated its "Near Coastal Waters (NCW) Strategic Planning Initiative," a multi-year effort to maintain and enhance near coastal water environmental quality. As the first stage of the NCW initiative, EPA's Office of Marine and Estuarine Protection released a "Strategic Options" paper in August, 1986 that substantiates the urgent situation we are facing. Quoting from the paper's introduction (footnotes omitted):

> Degradation of the near coastal water environment has become a critical national problem. The ecological, economic, recreational and aesthetic integrity of near coastal water systems in the United States is threatened daily by the cumulative impacts of a multitude of activities within the coastal drainage basins, in the near coastal waters, and on the oceans. Portions of near coastal water and shore habitats in every geographic region of the country and in every coastal state have been found to be degraded to a moderate or severe degree.

More recently, Congress' Office of Technology Assessment (OTA) issued a report titled Wastes in Marine Environments (April 1987), with its principal findings being "that estuaries and coastal waters are in deep trouble around the Nation, and that more coordinated waste management efforts are needed in many areas." While the OTA report found that "the health of the open ocean generally appears to be better than that of estuaries and coastal waters...," that finding contains an important qualification, i.e., that "considerable uncertainty still exists, however, about the ability to discern impacts, particularly long-term ones, that may have occurred in the open ocean."

In October, 1987, the National Oceanic and Atmospheric Administration's (NOAA) Estuarine Programs Office released a report titled NOAA Estuarine and Coastal Science Framework to provide long-term scientific direction for addressing four critical estuarine and coastal ocean problems: freshwater inflow and circulation problems; toxics, nutrients, and pathogens; habitat degradation; and declines in living resources. Based on its examination of those problem areas, the report's introduction notes that:

> The evidence clearly indicates that the health of our estuaries is declining. It is time to re-examine what should be done to conserve one of the Nation's most valuable resources. Unfortunately, the effects of human activities and natural changes to our estuarine and coastal environment are not well understood.

In addition to these government studies, one additional non-governmental report merits special mention as part of any national perspective on the health of ocean and coastal environment. Published in 1986 by the Coast Alliance, an umbrella organization comprised of representatives of most of the Nation's major environmental groups, And Two if by Sea: Fighting the Attack on America's Coasts is both a primer and a guide for action. And Two if by Sea provides persuasive evidence that our coastal areas are in trouble, with special emphasis on the growing threats caused by coastal hazards (especially ill-conceived development in high-risk areas), coastal pollution, energy and minerals development, and ocean dumping.

The report by Save the Bay, as well as the earlier ones by EPA, OTA, NOAA and the Coast Alliance convey, in detail, both the severity and magnitude of the problems facing our marine and coastal waters. More importantly, each of the reports contains numerous recommendations for action that deserve to be heeded as we collectively address, and redress, the existing situation.

While the principal focus of all of these reports is on near-coastal waters, as noted earlier, our inadequate understanding of oceanic processes and impacts of human activities in the deeper ocean are cause for caution. In important respects, we can use estuaries as mesocosms -- experimental subsets of the whole ecosystem -- of the open ocean. Just as scientists use mesocosms to predict ecosystem responses to specific stresses in estuaries, we can extrapolate the increasing stresses in estuaries to the oceans. Because of the tremendous size of the open ocean, estuarine-type reponses to stress or pollutants normally take much longer to be measured. But that is only a function of time, or inadequate measurements. Given the difficulties of responding to crisis situations in smaller, estuarine systems, the problem of protecting the open ocean becomes orders of magnitude more serious if we wait until similar crisis situations become apparent.

B. Major Sources of Marine and Coastal Pollution

The above referenced reports, as well as other recent research, indicate that a wide array of sources are affecting the quality of the nation's coastal and estuarine environments. Theses major sources include point source discharges, non-point source pollution, and physical or hydrological modifications to the shoreline or estuarine system. Other important sources of pollutants include ocean dumping of sewage sludge, dredge spoil and industrial waste and vessel source pollution. The resulting combination of effects of these sources on the coastal and estuarine environment has been classified into five major "national environmental problems" by the EPA. These are: (i) toxic contamination; (ii) eutrophication; (iii) pathogen contamination; (iv) habitat loss and alteration; and (v) changes in living resources.

Point-source contaminants enter the marine ecosystem through discharges from municipal sewage treatment plants, industrial and commercial facilities and combined sewer overflows (CSOs). Municipal point sources are major contributors of biochemical oxygen demand, pathogens, total nitrogen, and oil and grease. Industrial dischargers are the dominant sources of many organic chemicals and heavy metals, accounting for about 90 percent or more of the inputs of cadmium, mercury, and chlorinated hydrocarbons.

Non-point sources of pollution include runoff from cities, industrial sites, forestry, mining, and farmland, leachate from hazardous waste storage sites and landfills and atmospheric deposition. The varying sources of non-point source pollution generally contribute a large share of fecal coliform bacteria, suspended solids, oil and grease, lead, chromium, pesticides and chlorinated hydrocarbons. While information on the extent of non-point source pollution is limited, the resulting effects are generally considered more pervasive than point sources discharges.

While not a "pollutant" in the classic sense of the word, physical and hydrological modifications are another serious threat to the integrity of coastal and estuarine environments. The activities which result in altering or destroying habitat include dredging of channels, ports and marinas, draining and filling of wetlands, disposal of dredged materials, construction of dams, levees, and other flood control structures, shoreline, residential and commercial development, and diversions of fresh water for irrigation and water supply. Apart from the direct destruction of habitats, physical and hydrological modifications can also destroy the coastal environment's (e.g. wetlands) other functions such as the retention of sediments and nutrients.

These pollutant inputs are regulated by differing levels of government and different agencies under a plethora of laws and regulations. While EPA has the primary responsibility, their current approach is on a permit-by-permit basis and lacks a comprehensive approach. Given the complexity and breadth of the above inputs into the marine environment, a comprehensive approach to the management of waste inputs which focuses on all environmental threats to specific water bodies and regional areas is necessary. However, without specific changes in the current programs, and absent a national policy on the protection of the marine and coastal environment, a comprehensive management system is unlikely.

In the absence of such a policy, it is essential that steps be taken to ensure that each of the above pollutant sources be addressed. Too often, one polluter or regulator points the finger at another, and others blame others, with the end result being incremental and cumulative pollutant loadings that reach crisis-response proportions before corrective steps are taken.

C. Need for a Comprehensive EEZ Oceans Policy

Before turning to a brief examination of special problems at the regional level, there is one national/international policy that merits special consideration -- President Reagan's March, 1983, Exclusive Economic Zone (EEZ) Proclamation. As has been noted in various commentaries, the United States' EEZ encompasses some 3.9 billion acres, more than one and one-half times the 2.3 billion land acres of the United States and its territories. Within its EEZ, the U.S. has sovereign rights over all marine resources -- living and non-living -- subject to certain conservation standards. It has control of virtually all economic uses within that zone, with exceptions for navigation, and it has jurisdiction to regulate marine research and protect the marine environment.

The importance of EEZ resources for the future development of many of the world's nations is substantial. Over seventy percent of the world's population lives in coastal areas. Increasingly, the United States and other nations are turning to EEZ areas for food, energy and for strengthened economies. Globally, forty percent of our planet's ocean areas fall within 200 miles of adjacent coasts.

Given the magnitude and severity of marine and coastal pollution problems, as discussed above, it is imperative for the United States to develop an integrated and comprehensive approach to addressing ocean and coastal issues if we are to use, manage and protect our living and non-living resources. As an important step in that direction, a comprehensive assessment of the United States' EEZ policy would be most appropriate. Given the relatively recent status of the President's 1983 EEZ Proclamation, a major opportunity still exists to put in place effective EEZ strategies -- including environmentally oriented measures -- before less effective choices become entrenched.

Pieces of that assessment have been done -- such as the excellent analysis and recommendations concerning Federal/State relationships prepared by the Coastal States Organization in its April, 1987 report titled Coastal States and the Exclusive Economic Zone. That report, and other EEZ- and ocean policy-related studies of recent years serve as an excellent foundation for undertaking a comprehensive assessment of U.S. EEZ policies. With such an assessment in hand, U.S. policy makers and the public could then make informed decisions regarding the development and implementation of a sound and balanced EEZ oceans policy.

Regional Perspectives

Several indicators of marine environmental quality point to deteriorating conditions in the coastal marine ecosystems of this country. Increases in (1) episodes of low oxygen concentrations in the water column, (2) fish and shellfish diseases and anomalies, (3) contamination of tissues by heavy metals and organics, (4) phytoplankton (algal) blooms, (5) habitat loss -- especially loss of wetlands, (6) reproductive problems among birds dependent on the marine environment, (7) changes in the benthic community structure, including species diversity of bottom dwelling animals and plants, and (8) closures of shellfish and fishing areas for human health reasons are symptomatic of a multitude of anthropogenic insults accumulating in our coastal waters.

Though the symptoms are often the same, the particular problems causing marine ecosystem degradation may differ from location to location. For this reason, many researchers and regulators advocate a regional approach to trying to solve the problem of coastal pollution. This avoids the problems of inadequate funding and differing, sometimes opposing, strategies which would occur on local levels, but allows approaches which respond to the particular hierarchy of problems experienced in each region.

To illustrate this regional view of the U.S marine and coastal environment, I would like to highlight several estuaries and coastal regions -- though by no means all -- and examine some of their particular problems. Moreover, while it is my understanding that the focus of this hearing is on marine and near-coastal "salt" waters, many if not all of the "National Perspectives" presented above, and the "Regional Perspectives" contained in this section, are equally applicable to the Great Lakes "coastal" regions of the United States:

The Gulf of Maine includes the most pristine section of coastal waters to be found along the east coast of the U.S. However, signs of degradation, including increased turbidity, sediment contamination, algal blooms, local anoxia, and localized changes in the benthic community suggest cause for concern. Certain algal blooms have even been found to aggravate the acid rain/acid fog problem. All these changes suggest growing pollution from land drainage aggravated by increased development, and small scale industrial pollution, plus intensive municipal and industrial outfall in the south (i.e. Borton Harbor). It also appears, though, that PAH-contaminated sediments result as well from atmospheric transport of the pollutants.

Massachusetts Bay and Cape Cod Bay, which are part of the Gulf of Maine regional system, are experiencing even greater stress exerted by the urban and industrial development around Boston. High incidences of tumors, disease and structural anomalies have been found in fish and shellfish populations, particularly associated with sediments containing high concentrations of toxics in the vicinity of sewage and industrial discharge. Undertreatment of municipal sewage and indiscriminate discharge of toxic industrial byproducts are the major culprits in this area. The impact on humans in this region is felt primarily by the commercial and recreational fisheries and other recreational interests, with reduced fish and shellfish populations, contaminated and diseased fish and shellfish, and closures of shellfish areas.

Narragansett Bay in Rhode Island is another important fishing and recreational area which is feeling the impact of increased urban and residential development as well as effects of a long history of industrial pollution in rivers feeding the Bay. Urban runoff and fallout from air pollution are currently two of the most potent sources of contamination. Concentrated blooms of one or more species of phytoplankton (algae), local anoxia and areas of sediments heavily laden with heavy metals and toxic organics are characteristic symptoms of pollution experienced in this estuary. Shellfishing is frequently interrupted by bed closures and both fish and shellfish catch are down. The offshore fisheries also depend on this estuarine system as it is an important nursery ground.

The **Long Island Sound/New York Bight** area is considered the area with the most voluminous and concentrated urban and industrial outfalls. Massive algal blooms and periods of oxygen depletion over large areas of bottom waters have become common occurrences off the New York and New Jersey coast, and fish and shellfish kills have sometimes resulted. These are alarming signs of environmental degradation, especially when added to stock depletions, diseases and physical anomalies, and high levels of tissue contaminants (heavy metals and toxic organics) in fish and shellfish. Furthermore, benthic communities have experienced large long-term changes with few species surviving in the most concentrated outfall zones where sediments are laced with excessively high concentrations of toxics.

Aggravating the Bight's problems caused by urban discharge and runoff are the deposition of dredge spoils and the dumping of sewage sludge at designated off-shore sites. Sewage sludge dumping at the "12-Mile Site" off New Jersey, which ended only this past December, is responsible for significant degradation of that area. While the transfer of sludge dumping to the "106-Mile Site" has provided a politically expedient short-term solution to managing that hazardous waste, reports of threats to and depletion of fish stocks in traditional fishing grounds in the vicinity of the 106-Mile Site raise serious questions about the wisdom of using the oceans as a sewer. Needless to say, fishing, recreation, and human health are all threatened in this region, as is emphasized by numerous fish, shellfish and beach closings.

The **Chesapeake Bay** is another infamous area experiencing severe symptoms of pollution. Periods of low oxygen concentration, extensive microalgal blooms and loss of the submerged aquatic vegetation (SAVs) are changes which have been well publicized. The effects on fisheries (e.g., rockfish) and shellfisheries (especially oysters) have been devastating as species become diseased or depleted. Agricultural and urban runoff plus municipal sewage discharge have been identified as major pollutant sources. Although regulatory efforts have begun, improvements in environmental health have not yet appeared and the threat to this ecosystem remains ominous and immediate.

The southeast coast, as exemplified by Pamlico and Albemarle Sounds, is affected primarily by land runoff and residential development. These result in eutrophication of coastal waters as evidenced by algal blooms followed by incidences of low oxygen as the algae decompose. Nutrient enrichment is accompanied by pesticide contamination from agricultural and residential areas draining into rivers and estuaries, with toxic threats to the biota. Submerged seagrass beds are beginning to disappear and fish populations are experiencing disease and depletion.

The Gulf of Mexico is a very large region experiencing marine ecosystem degradation resulting from several factors which are more prevalent there than in other coastal regions. Point source discharges are dominated by the petrochemical and chemical facilities which proliferate in the region. This, combined with general urban discharge and relatively shallow waters and poor circulation, has caused an accumulation of environmental hazards resulting in extensive occurrences of low oxygen concentrations and depletions and closures in the recreational and commercial fisheries. Combined with toxic organic chemical pollution, large inputs of nutrients from agricultural runoff from around the Gulf and draining in from the heartland of American agriculture result in eutrophication contributing to low oxygen levels and increased incidences of red tides (microalgal blooms).

Habitat degradation in the Gulf is exemplified by a loss of wetlands which proceeds at an alarming pace -- averaging 50 sq. miles lost each year, and amounting to as much as 80% of the total annual wetland loss in the nation. Dredging and filling operations and freshwater diversion combine with rising sea levels to effect this wetland loss. Marine dependent birds in the Gulf region have been plagued with reproductive difficulties symptomatic of pollution from heavy metals and toxic organics. These maladies, combined with destruction of breeding habitats, have resulted in bird population depletions, including the extinction of the Brown Pelican from this region.

San Francisco Bay, which is ringed by urban development, exhibits most of the maladies exhibited by eastern urban estuaries. In addition, this estuary is affected by freshwater diversions, particularly during spring months when freshwater flows are crucial for fish migration and spawning. The diversion of water for human consumption and utilization has resulted in increased salinities and salt water intrusion, loss of wetlands, and reduced flushing and circulation which compound the effects of urban discharge. Massive reductions in fish populations due to increasingly unfriendly environmental conditions, fish and shellfish disease and structural anomalies, changes in benthic community structure and increased turbidity are attributed to effects of urban discharge and runoff, plus drainage from agricultural lands via rivers feeding the Bay.

Puget Sound in Washington State is a large estuary with intense pollution problems centered around the urbanized portion of the shore which includes Seattle, Tacoma and Everett. Toxic hot spots and areas of eutrophication are found around points of municipal and industrial discharge and at the mouths of industrialized rivers feeding the Sound. Problems are especially intense in some of the numerous embayments and inlets. Hundreds of municipal and industrial pipelines currently discharge wastes into the Sound, and dredge spoil deposition has aggravated the problem in some areas. Non-point source runoff from commercial forest lands and agriculture add to the problem of urban outfalls. As in other urban coastal areas, fish disease, shellfish bed closures and algal blooms are symptomatic of an ecosystem going awry.

Needed Actions

As noted previously, each of the referenced "national" reports contain numerous findings as to the adequacy of existing programs and activities, and recommendations for new or modified actions to protect and restore marine and coastal areas. Given the participation of other witnesses here today who can speak directly to the various findings and recommendations in reports or studies that they have speerheaded, my comments here are intended to highlight some of the existing inadequacies and recommended changes that are needed.

I would, however, like to reiterate the Oceanic Society's endorsement of the current, five-point "National Agenda" set forth in the report being released today by Save the Bay concerning: subsidy busting; source reduction; wetlands; an aquafund program; and environmental law and order. That agenda calls for, and merits, action, now. In addition, that report contains forty-three issue-specific recommendations that also merit follow-on actions by decision makers.

As often is the case, recommendations for action are premised on inadequate existing conditions. Without belaboring the inadequacies of current policies and programs, the following, non-prioritized listing of recommended actions highlights concerns that merit appropriate action by Congress, other decision makers and the public-at-large:

(1) **A hierarchy of waste management** should be applied for each waste proposed for discharge into ocean or coastal waters. Source reduction is the primary goal at the top of the hierarchy. Recycling and recovery provide a second line of defense. Treatment is a third tier approach. Disposal, whether on land or at sea, is the least preferred option. This hierarchy

should be rigorously applied for all discharges into the marine environment;

(2) A comprehensive national strategy for managing waste is sorely needed. Without an overall strategy, we can expect the fragmented structure of laws governing waste management to continue to direct waste streams to the most convenient disposal method, rather than those which will result in the least environmental burden. Too often the most convenient method is ocean or coastal disposal;

(3) A national strategy for waste management should include significant measures to achieve waste reduction, including the establishment of an EPA Office of Waste Reduction, the establishment of incentives to encourage waste reduction, and, in some instances, the establishment of mandatory source reduction requirements;

(4) Effective management of ocean and coastal resources requires the institution of an "ecosystem" approach, whereby Federal, State, and local authorities undertake cooperative efforts to regulate all activities impacting on an identified ecosystem (e.g., Gulf of Maine, Chesapeake Bay, or Louisiana's wetlands). Specific goals for maintaining and improving each ecosystem should be agreed upon and actively pursued. In many instances this will require substantial cooperation among States and between States and the Federal government -- an approach which has met with some success in the Chesapeake Bay region;

(5) In contrast with the ecosystem approach, far too much credence has been given to the scientific concept of "assimilative capacity," which tends to legitimize inappropriate use of the ocean for waste disposal by setting arbitrary upper limits in situations where there is insufficient information about the adverse impacts. Standard setting in such situations can then more easily be geared to industry's needs, rather than focusing on what is needed to protect, preserve and restore marine and near-coastal waters;

(6) Current regimes for controlling pollutant inputs into coastal and ocean environments have failed. Such regimes must be expanded to control a wider range of pollutants and a greater number of industrial sources. In addition, technology-based standards for individual pollutants must be complemented by effective environmental standards that set minimum limitations and allow further limitations based upon site specific characteristics and cumulative inputs;

(7) Current laws are not adequately enforced. Fines imposed for violations by permittees must be high enough as to pose a sufficient deterrent. Efforts must be increased to identify

illegal dischargers. A substantial increase in enforcement necessitates an increase in resources and expertise allocated to that task. Both the Federal government, and the States -- such as those 38 States which have assumed full responsibility for operating the Clean Water Act's NPDES program -- need to carry out their responsibilities in an effective manner;

(8) The Marine Protection Research and Sanctuaries Act (Ocean Dumping Act) should be amended to set a date certain for phasing out the use of the ocean for dumping of sewage sludge and industrial waste. Such amendments should include a requirement that current dumpers enter into legally binding agreements with EPA that set out realistic schedules for meeting the legislated deadline. In addition, enforcement mechanisms under Federal law must be strengthened to address the problem of illegal dumping (similar to that in the proposed Shore Protection Act -- S. 1751);

(9) As part of the implementation of the new domestic law and international treaty (MARPOL/Annex V) that prohibits discharges of ship-generated plastics, EPA should aggressively pursue ways to address other sources of plastic pollution of the marine environment, including beach debris, industrial discharges, municipal outfalls and illegal ocean dumping;

(10) Additional laws are needed to ensure effective regulation of all activities that may contribute to degradation of the marine environment. A comprehensive domestic law for oil spill liability and compensation is needed to replace the fragmented laws that currently exist. This domestic law should be complemented with U.S. ratification of international protocols on oil spill liability and compensation. For seabed mining in the EEZ, a comprehensive, stand-alone statute is needed to replace the "Model T" provisions of the Outer Continental Shelf Lands Act Amendments. As one other example, a comprehensive "Wetland Habitat Protection Act" would help provide effective protection of those critical resources;

(11) There must be an increased effort at effective monitoring to accompany regulation and enforcement. To ensure that designated funds are spent wisely, monitoring programs must be properly designad to answer the most pressing environmental questions. This will require better coordination among the various governmental agencies and academic institutions involved in implementing monitoring programs. Along with monitoring, there needs to be an improved effort at interpreting data and using the conclusions to make meaningful regulatory decisions. However, monitoring should not be used as a substitute for assurances that a particular activity will not lead to significant adverse environmental impacts. Too often regulatory agencies rely on monitoring as a means to ensure environmental

designated funds are spent wisely, monitoring programs must be properly designed to answer the most pressing environmental questions. This will require better coordination among the various governmental agencies and academic institutions involved in implementing monitoring programs. Along with monitoring, there needs to be an improved effort at interpreting data and using the conclusions to make meaningful regulatory decisions. However, monitoring should not be used as a substitute for assurances that a particular activity will not lead to significant adverse environmental impacts. Too often regulatory agencies rely on monitoring as a means to ensure environmental safety when potential effects are unknown. Such reliance is misplaced. Once adverse impacts are discovered through monitoring, it is often too late to redress the situation. The damage is already done;

(13) **Basic and applied research can contribute substantially to our understanding of marine and coastal ecosystems.** Towards this end, in concept the Ocean Pollution Planning Act of 1978 is on target in its efforts to coordinate and set priorities for needed research. Despite several strengthening amendments enacted in 1986, though, the Act still remains largely a "paper tiger" that is not taken seriously enough, even within NOAA, its parent agency. As suggested earlier, research that is designed to meet local- or region-specific needs promises to be the most effective. Towards that end, the Oceanic Society strongly supports the overall thrust of proposed legislation -- the Marine Research Act of 1988 (S. 2068) -- that this Subcommittee will be examining more closely later this month;

(14) Given the scale of our inadequate understanding of marine processes, **far too little attention has been devoted to the concept of protected areas in which marine and near-coastal areas would be protected against harmful activities.** In light of the increasing rate of coastal habitat destruction, additional steps need to be taken by NOAA and EPA to ensure effective protection of important estuarine resources. Similar steps need to be taken in offshore areas. Unfortunately, though, the promise and potential of the marine sanctuary program (under Title III of the Ocean Dumping Act) has not been fulfilled, and every effort needs to be made to breathe new life into that program as part of its now pending reauthorization. Related steps to adopt or implement "stable reference areas" in relation to seabed mining and "special areas" under the MARPOL annexes also need to be vigorously pursued by U.S. officials;

(15) **Both intra-agency and inter-agency coordination must be improved** for those Federal agencies responsible for managing ocean and coastal environments. More effective coordination should result in increased information exchange, decreased duplication of research efforts, and more effective regulation

in recent years. Programs like those administered under the Coastal Zone Management Act of 1972, and the National Sea Grant College Program Act of 1976, are the extreme examples of worthwhile programs where the current Administration has exhibited a "penny wise and pound foolish" mindset in repeatedly seeking to zero-budget them. In many other less extreme cases, though, both the Administration's proposed budgets, and those approved by Congress -- for programs like the Coast Guard's vessel surveillance activities in coastal waters, or the EPA's Near Coastal Waters Strategic Planning Initiative -- have received far less funds than they deserve;

(16) **The public must be informed and educated** about problems associated with ocean and coastal pollution, and about the major role of the marine environment in sustaining a habitable planet. The public should be provided with specific information about the role individuals can play in reducing pollutant loadings (e.g., proper disposal of household hazardous materials, recycling of solid waste, and citizen beach clean-up efforts). While environmental groups can and must play a key role in informing and educating the public, this task also should be a major activity of decision makers in government, industry and academia;

(17) **Opportunities for meaningful public participation must be increased and strengthened.** Effective public participation includes (1) access to critical information about activities affecting marine and coastal resources; and (2) early involvement in oversight and decision making concerning such activities, including reasonable comment periods and opportunities for public hearings;

(18) **NOAA and/or EPA should develop and implement a pilot "Citizens' Coastal Toxics Hotline" project** that provides the public with direct and immediate access to decision makers to voice complaints and concerns about marine and coastal pollution. Federal and/or State officials manning such a Hotline should either be capable of handling and responding to the complaint in an expeditious manner, directly, or of providing the caller with specific information as to those responsible Federal or State officials who have responsibility for dealing with the complaint;

(19) **The coastal States' role in managing ocean and coastal resources must be maintained and strengthened.** States participating in the coastal zone management program should be encouraged to exercise authority under their coastal zone management plans to control pollutant inputs and activities effecting their coasts. Over the past eight years NOAA has attempted to "put a leash" on the ability of States to oppose Federal activities which they view as inconsistent with their coastal zone management program. Greater participation by

responsible Federal or State officials who have responsibility for dealing with the complaint;

(20) **The coastal States' role in managing ocean and coastal resources must be maintained and strengthened.** States participating in the coastal zone management program should be encouraged to exercise authority under their coastal zone management plans to control pollutant inputs and activities effecting their coasts. Over the past eight years NOAA has attempted to "put a leash" on the ability of States to oppose Federal activities which they view as inconsistent with their coastal zone management program. Greater participation by States in the decision making process is likely to improve environmental quality in coastal areas because the States directly benefit from a healthy and clean marine environment and therefore have a strong incentive to protect the resources it provides;

(21) As a key component of the 1987 amendments to the Clean Water Act, Congress directed States to develop programs to begin to reduce non-point source pollution. By all accounts, the harm caused by this form of marine and near-coastal pollution -- which had previously been largely uncontrolled -- has become increasingly obvious. **Each coastal State needs to develop and implement effective programs to control non-point source pollution**, including the submission of an "assessment report" and a "management program" by August, 1988;

(22) Complementing efforts at the Federal level under statutes like the Coastal Zone Management Act, **States need to pursue local- or region-specific measures to ensure environmentally sound planning, development and activities in coastal areas.** As one excellent example of such efforts, the State of Maryland's Criticial Areas Commission represents a pioneering program that that restrains and manages the impact of human activities in the immediate vicinity of the Chesapeake Bay, its tributaries and adjacent shoreline areas;

(23) Consistent with my earlier "National Perspective" comments, **a comprehensive review of the United States' EEZ ocean policies, including needed environmental safeguards, should be carried out.** Towards this end, the Oceanic Society supports in principle proposed legislation now pending in both the Senate (S. 562) and House (H.R. 1171) that would achieve this objective, as well as a broader review of U.S. oceans policy.

(24) At the multi-national, regional level, the United States should **aggressively pursue opportunities to advance the Caribbean Regional Seas Convention**, including adoption of special protocols dealing with land-based sources of marine pollution and wildlife/critical habitat; and the Administra-

protection of living marine resources. At the same time, the U.S. should take a leadership role in working with other governments to amend the Convention's deep seabed mining provisions (Part XI), e.g., narrowing the scope and detail of Part XI and providing for a "skeletal" agreement on the general principles that should be followed; and

(25) Complementing the Law of the Sea Convention, other global treaties contain important marine protection standards -- such as the London Dumping Convention (for matters such as radioactive waste dumping at sea and ocean incineration), and MARPOL (which addresses vessel source pollution), the International Convention for the Regulation of Whaling (under which a moratorium on commercial whaling is now in place) and the Antarctic Treaty (which provides the foundation, in part, for examining the efficacy of allowing minerals development in the Southern Ocean) -- that merit a leadership role by U.S. officials in promoting environmentally sound measures.

Conclusion

Although the oceans have been in existence for billions of years, their degradation is a process which began only recently, a by-product of an increasingly crowded and complex world. The responsibility is ours to protect those aeons of natural investment. Other problems may seem more immediate, but few are as pervasive in their implications.

Underlying each of the Oceanic Society's recommendations, an ecological ethic is essential if we are going to ensure the protection, conservation and wise use of our vital marine resources. With such an ethic firmly in place, policies affecting the future of the oceans and near-coastal waters can and must be developed, implemented and carried out with environmental consequences and respect for the linkages in the ecosystem as primary considerations. My organization looks forward to working with you, Chairman Mitchell, and other Members and staff of this Subcommittee, in acheiving that objective.

Again, thank you for the opportunity to participate in today's hearing. I would be happy to answer any questions that you might have.

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TESTIMONY OF

SARAH J. TAYLOR
VICE-CHAIR, COASTAL STATES ORGANIZATION

BEFORE THE
ENVIRONMENTAL PROTECTION SUBCOMMITTEE
OF THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

April 20, 1988

Mr. Chairman and Members of the Subcommittee, I am Sarah Taylor, Executive Director of Maryland's Chesapeake Bay Critical Area Commission and Vice-Chair of the Coastal States Organization, a representative association for the governors of the 35 coastal states, territories and commonwealths. I am delighted to have the opportunity to address you today on the topic of coastal pollution, and to speak on this critical issue from the perspective of states in all regions of the country.

A PERSPECTIVE ON THE ISSUE OF COASTAL POLLUTION

As discussed in the 1987 Office of Technology Assessment (OTA) report, "Wastes in Marine Environments," the health of our nation's coastal waters has continued to decline despite the existence of numerous federal and state laws and programs to combat coastal pollution. The inevitable conclusion from this finding is that we are not doing enough, nor has our attention been focused long enough in the areas requiring action. A significant recommendation of the OTA report was that technology-based controls must be supplemented by water quality goals and the implementation of regional waterbody management which includes all levels of government.

With the recently enacted Water Quality Act, we are moving to assess and prioritize waterbodies with impaired uses, the central cause of which is toxic and nonpoint source pollution. These new programs will need funding and time to work.

In examining the coastal pollution problems of the various regions of the country, several recurring themes are evident, namely concern over the presence of toxics in coastal waters and sediments, nonpoint source inputs of both conventional pollutants and toxics from urban and agricultural runoff, fish and shellfish declines, and ocean pollution. I would like to summarize these predominant coastal pollution issues on a regional basis, giving an assessment of the extent of the problems, state initiatives to address them, and ways in which federal efforts can or should be directed to assist in addressing these problems.

I do want to emphasize that although you will be hearing a lot this morning about the very real coastal pollution problems facing the nation, the states have not sat idly by waiting for a federal solution. Rather, states have in many cases taken innovative steps, using existing federal programs, to combat coastal degradation, and they have made major commitments of their own state funds.

POLLUTION ISSUES AND ACTIONS

Northeast and Mid-Atlantic

Although the Gulf of Maine is generally considered to be relatively pollution free, there is a growing awareness of the potential for future problems. Fish and shellfish resources are a vital part of Maine's economy, with total landings of finfish and shellfish in the state in 1984 valued at $104 million. Concerns over declining landings have been the impetus for Maine's increasing attention to coastal pollution. For example, from 1960 to 1984, total finfish landings declined by nearly 50 percent.

Preliminary evidence of hydrocarbons, trace metals and synthetic organics in sediments of major bays is a source of concern. The primary sources of pollution to the Gulf of Maine are believed to be nonpoint source (specifically urban runoff) and air-borne pollutants (aromatic hydrocarbons and nitrogen precipitation into surface waters). For example, incidents of flooding from storms and spring snowmelt have resulted in closure of shellfish beds due to bacterial contamination. In response to these problems and their effects on commercially important fisheries, last year the State of Maine passed an overboard discharge ban to prohibit single family residences from discharging chlorinated sewage into the waters of the state. In addition, a bill is currently moving through the Maine state legislature to create an environmental monitoring program for near coastal waters. An EPA regional assessment of existing data bases, being conducted as part of the agency's near coastal waters initiative, should be helpful in this effort.

New Jersey's Governor Kean has proposed a 14-point plan to address coastal pollution with a commitment of $200 million in state funds over 5 years. Nonpoint source pollution is a significant problem for this state's highly developed/urbanized estuaries, such as the Hudson/Raritan Bay system. Thus, Governor Kean's plan calls for $60 million in state money ($20 million local match) to address nonpoint source pollution related to storm events (including the inventory of stormwater outfalls, correction of cross-connected sanitary and storm sewers, and enforcement of stormwater management regulations), and $75 million (with $25 million local match) for emplacement of screens and disinfection at combined sewer overflow (CSO) points. New Jersey is relying upon EPA grants to improve its sewage treatment facilities and is using NOAA data to monitor water quality trends to help carry out its program.

New York/New Jersey Harbor, home to over 16 million people, is subject to a waste load of approximately 2.5 billion gallons per day, primarily from municipal sources. CSOs and rainwater runoff for New York City alone has been estimated at 882 million gallons per day. New York City's Mayor Koch has budgeted $500 million over the next ten years to abate combined sewer overflows, and $50 million has already been spent to address CSOs in Brooklyn and Queens.

Another issue of concern, and one which has received much public attention, is that of floatables. Washup of plastics, garbage and hospital wastes on New Jersey beaches last summer resulted in beach closings which affected the State's tourist industry. Sources of floatable material include ship-board generated garbage, illegal dumping, material blown from landfills or garbage transport barges and CSOs. New Jersey plans to provide $4 million in grants to municipalities for purchase of equipment for beach cleanup and improved sanitary actions such as cleaning of storm drains to reduce stormwater-transported litter. The state will also provide a $5 million increase in funding for state marine police to crack down on illegal dumping in state waters.

In addition, the construction grant set-aside for marine CSOs contained in the federal Water Quality Act of 1987 will be helpful in addressing the problem of floatables; $21 million is available from the EPA in FY88 for grants to municipalities to address priority CSOs, and a number of applications have been received by EPA from areas in the Northeast.

Since the signing of a second Chesapeake Bay Agreement in December of 1987, the states of Maryland, Virginia and Pennsylvania and the District of Columbia pledged along with EPA, the Department of Commerce, and the Department of the Army, to continue the restoration effort for the Chesapeake Bay. Several million dollars through EPA's National Estuary Program, technical data through NOAA, and resource restoration monies through the federal coastal zone management program and the Corps of Engineers are necessary to keep the over $100 million state effort moving forward.

Southeast and Gulf of Mexico

Florida, as a state experiencing continuing rapid population growth (approximately 5000 people per week move into the state's coastal areas)~~,~~ is faced with the task of providing expanded and upgraded sewage treatment capacity. However, nonpoint source pollution, which also increases with population growth, has been targeted as the major coastal pollution problem. For example, there is concern that toxics associated with Miami River plumes may be linked to the die-off of the sea grass beds which are an important component of Florida's near-shore ecosystems. Under the 1987 Surface Water Improvement and Management Act (SWIM), Florida has already committed over $30 million in state research and management funds to assess and prioritize inland and coastal waters, develop management plans and begin restoration and preservation of those most threatened resources. Over the last several years, Florida has been conducting an ambitious program of water and sediment quality monitoring and assessment in the state's coastal waters, including ports and some inland waterways. The state has developed sediment quality criteria which are used in conjunction with water quality standards.

Nutrient over-enrichment in the Gulf of Mexico as a result of agricultural runoff and riverine inputs (the Gulf drains over 50% of the land area of the contiguous U.S.) has led to oxygen depletion in many Gulf estuaries, with potentially drastic effects on Gulf fisheries. Excess nutrients may also contribute to the occurrences of red tide outbreaks off the coasts of Florida and Texas.

In November of 1987, a red tide event was detected off the coast of North Carolina. The red tide organisms are believed to have been transported to North Carolina's coastal waters by the Gulf Stream from a bloom which occurred off the Florida coast. The bloom off North Carolina resulted in the closure of shellfish beds by the state and closure of some public beaches by local governments. Although many of the shellfishing areas were reopened by March of this year, the economic effects on the area have lingered. The state estimates that for November through January the dinoflagellate bloom resulted in the loss of nearly $24 million to the economies of 4 coastal counties, when considering the impacts on motels, restaurants, charter boats, seafood processors etc. as well as the direct loss of income to fisherman in the area.

Closures of shellfish beds in the Gulf are also caused by bacterial and viral contamination. According to a NOAA study published in January of this year, shellfish harvesting is prohibited in 29% of Gulf coastal waters and an additional 27% of waters may not be harvested after heavy rainfall. Despite budgetary restrictions, the states have worked to survey shellfish growing waters and classify them as approved, conditionally approved, restricted, or prohibited for shellfish harvesting, based on concentrations of fecal coliform bacteria present.

Toxics are also entering the Gulf, both from pesticides in agricultural runoff and point source discharges (nearly half of the point source discharges to the Gulf are from petrochemical and chemical facilities). As a pilot project funded through EPA's near coastal waters initiative, Florida and Alabama will develop and demonstrate a bi-state and local management action plan for nonpoint source pollutants entering Perdido Bay, which lies between the two states.

The State of Texas has led the fight to reduce the problem of floatables in the Gulf, especially plastic debris thrown overboard by maritime shipping. Due to prevailing currents in the area, large amounts of this material have been washing up on Texas beaches where it must be picked up by state personnel and volunteers. With the recent U.S. ratification of Annex V to the MARPOL treaty and passage of implementing legislation, there is hope that a major source of floatables in the Gulf will soon be controlled.

Pacific Coast

The accumulation of toxics in the sediments of urbanized portions of Puget Sound is viewed by many resource managers as the greatest threat to the resource, but the incidence of pathogen contamination in near-shore waters, with resultant closure of shellfish harvesting areas, has been on the rise. In response to these concerns, the State of Washington in 1985 created the Puget Sound Water Quality Authority to develop and oversee implementation of a comprehensive water quality management plan for Puget Sound. The Puget Sound plan, which went into effect in January of 1987, addresses both point and nonpoint source pollution, as well as the development of research priorities and long-term education and public involvement. Specifically with regard to toxics, the state plans to strengthen consideration of toxics in point source discharge permits and require monitoring designed to detect toxics not only in the water column, but in sediments and the particulate fraction of effluents.

State support to implement the plan is about $20 million/year in addition to the over $1 billion in state and federal money which will be needed to upgrade sewage treatment facilities from primary to secondary treatment. The state has established a statewide Clean Water Fund, which receives $40-45 million/year from a cigarette tax, to support this series of initiatives.

Federal assistance through EPA and NOAA programs has been helpful to the state efforts. For example, NOAA has provided scientific data and advisory and coordination assistance, while funding through EPA's national estuary program (about $1.3 million/year for Puget Sound over the last several years) supported the development of an urban bay action strategy for areas with serious toxic sediment contamination.

California's San Francisco Bay is another example of a waterbody which has been degraded by inputs of nutrients, pesticides and toxics. At the same time, large diversions of freshwater have reduced system flushing and pollutant dilution. These impacts are those almost inevitably associated with a densely urbanized estuary. State and federal programs, coordinated through EPA's national estuary program, are attempting to turn this trend around. NOAA and the U.S. Fish and Wildlife Service also have ongoing ecosystem research and monitoring in the Bay which should produce data to assist state resource managers.

With assistance from EPA, Oregon is developing a Coastal Resource Action Plan to protect coastal water quality through demonstration of point and nonpoint source pollution control techniques for the Coquille Estuary. Subsequently, these techniques will be applied to Oregon's other coastal watersheds.

Great Lakes

Recent years have seen rather dramatic improvements in Great Lakes water quality with respect to conventional pollutants and nutrients. However, lack of technological and regulatory attention to toxic compounds has led to unexpected levels of these pollutants in water, sediments and biota of the Great Lakes. In May 1986, the governors of the Great Lakes states signed the Great Lakes Toxic Substances Control Agreement, which recognized toxics as the foremost environmental issue confronting the Great Lakes. Under the agreement, states have established uniform fish consumption advisories, a system for information exchange on accidental discharges of toxics, and are working to make the various state permit systems compatible.

In addition, the Great Lakes governors have joined in a commitment to establish a Great Lakes Protection Fund to provide up to $10 million annually for work under the Toxic Substances Control Agreement, including improved water quality monitoring, research into economic, environmental and human health effects of contamination, toxic cleanup techniques etc., with an eye to the implementation of basin-wide water quality management regimes.

The State of New York is participating with the EPA and Canada in developing a comprehensive toxics management plan for Lake Ontario. However, even with such efforts to address point sources of discharges of toxics, past toxic discharges have resulted in contaminated sediments which may require remedial action. Unfortunately, federal and state Superfund remedial activities are focused on areas which threaten human health, rather than sites which are causing aquatic resource declines.

WHY CONTINUE THE FEDERAL EFFORT?

In order for the above mentioned approaches to succeed, there is an urgent need to maintain the existing federal effort, through NOAA's coastal zone management, monitoring and benthic surveillance programs, the national estuary program, and EPA's near coastal waters initiative. Also, development of regulations to implement Annex V to the MARPOL treaty, which deals with ship-generated garbage, is needed to reduce the problem of floatables. We are just getting started with nonpoint source pollution control programs under the 1987 Water Quality Act, and we are just beginning to tackle the problem of toxics which may require changes in the role of municipal sewage treatment facilities, strengthened enforcement of pretreatment standards, consideration of toxics from CSOs and remedial action for toxic contaminated sediments. Clearly, no one level of government, acting by itself, can effectively address these problems and resolve them. It will take the coordinated action of all levels of government (federal, state and local), as well as industry and the public if there is to be progress.

RECOMMENDATIONS

In order to ensure that the funding available through the federal programs is being used in the most effective way to address these problems, the Coastal States Organization recommends that the Committee consider ways to strengthen and tighten the coordination among existing federal programs, and between federal and state efforts. In light of the fact that many coastal degradation issues are regional, regional solutions will be required. State coastal zone management programs should be utilized for the coordination of the numerous research, management and regulatory efforts which seek to improve the quality of coastal resources. For example, estuarine management plans developed under the National Estuary Program should be incorporated into the relevant state(s)' federally-approved coastal zone management programs.

The Committee should also consider ways to improve data transfer. Much of the data from federal programs would be of great value to state resource managers if it were provided in a useable format. In addition to increased state-federal cooperation, efforts to exchange data among the various federal programs (e.g., NOAA's estuarine reserves, U.S. Fish and Wildlife Service ecosystem research, NSF's coastal long-term ecological research sites, and the National Estuary Program) should be stepped up.

And, a final point, and one of which I am sure you are aware, is the need for long-term commitment to the programs outlined in this testimony. For example, having achieved significant gains in the area of conventional pollutants with the construction and upgrade of sewage treatment facilities, we should be careful not to lose this ground as we turn our collective attention to toxics and nonpoint source pollution. The Administration's proposal to phase out the construction grants program at a more rapid pace than determined by Congress, while proposing a reduction in the "seed money" for establishing state revolving loan funds (the Administration's FY89 request of $750 million for both of these items is just half the authorized level) could jeopardize the states' ability to assume responsibility for this program.

We cannot view our coastal pollution problems as in need of a quick fix, but rather must realize we are in this for the long haul. The solution lies in doing a better job of preventing additional inputs of pollutants to our coastal waters, through institution of nonpoint source controls and effective enforcement and monitoring, while at the same time continuing to look for existing "hotspots" or problem areas which require remedial action.

I thank you for the opportunity to address the Committee today, and I will be happy to answer any questions you may have.

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**TESTIMONY TO UNITED STATES SENATE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS**

SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

**REVIEW OF ENVIRONMENTAL CONDITIONS AND
TRENDS IN MARINE AND COASTAL WATERS**

APRIL 20, 1988

**Submitted By Trudy Coxe
Executive Director**

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SAVE THE BAY

TESTIMONY TO THE SENATE SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

On behalf of the 10,000 members of Save The Bay, Inc., thank you for allowing me to share our concerns on coastal water pollution.

Last October, Save The Bay had the opportunity to sponsor the nation's first conference of activists working to protect our bays, sounds and Great Lakes. At that conference we learned that the issues we in Rhode Island face are very similar to those faced in other coastal areas. In fact, this morning at breakfast I briefed over 30 members of Congress on the findings of this conference. I therefore come to you today with the conviction that what is good for Narragansett Bay is good for the nation as a whole.

The industrial revolution began in Rhode Island, attracted by waterways which provided for convenient

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disposal of our wastes. We have been suffering the unfortunate effects ever since. Our Bay today is ironically both a food source and a waste receptable, a situation common to most bays around the nation.

This dual use of our waters has had devastating effects. The Providence River is unsafe - even for swimming. Fully one third of the shellfish beds in Narragansett Bay are closed because of pollution, resulting in millions of dollars in lost revenues. Striped bass can no longer be caught in Rhode Island because of PCB contamination. Cancers, tumors, and ulcers are found in our fish, and many do not reproduce well. Recent research in Narragansett Bay suggests that even when fish are not dying, long-term exposure to toxics is weakening their immune system.

The effects on human health are unknown, since unlike beef and poultry, seafood is not inspected by the US Food and Drug Administration, and standards have been set for only a few pollutants. It is inevitable though that the poisons we dump in the water will come back to haunt us.

There are several sources of contamination of Narragansett Bay. These sources include: 1) toxic pollution from indirect discharges, primarily the jewelry industry; 2) urban runoff; 3) combined sewer overflows; 4) and air pollution.

One of the largest sources of toxic contamination to Narragansett Bay is the jewelry industry, which dumps its waste in our sewers. Save The Bay researched this problem in depth two years ago, and wrote "Down the Drain: Toxic pollution and the Status of Pretreatment in Rhode Island," the only report of its kind. That report revealed that 700,000 pounds of toxic metals were being dumped into Rhode Island sewers each year. That includes enough nickel to manufacture 60 million nickels, and enough copper to run a wire from here to Los Angeles.

If the Clean Water Act were enforced, this problem would not exist. It requires that industries treat their wastes before discharging to sewers. Yet, four years after deadlines were to be met, violations are widespead and enforcement almost nonexistent. Virtually every local program in Rhode Island for enforcing these regulations is ineffective and Rhode Island is typical of the national situation. A recent report to Congress by EPA stated that 3 out of every 4 sewage plants are not stopping toxics being discharged into our Nation's waters.

Part of the problem is that EPA has chosen to interpret the goals of the Clean Water Act far more narrowly than was intended. Permits are being written to protect our water, but not the underlying sediments which are critical to marine life. Many pollutants are not even regulated. In some industries, every pound of regulated chemical discharge is matched by two and a half pounds of unregulated chemicals. Unless these regulations are expanded, the goals of the Clean Water Act cannot be achieved.

A larger part of the problem is that the federal government has not put in place an aggressive program to actually reduce the use of toxics despite the fact that the basic premise behind the Resource Conservation and Recovery Act is "that wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible." The federal government must take a leadership role and put in place a comprehensive waste reduction program that fullfills this national policy because pretreatment programs simply cannot solve the toxics pollution problem in the long-term.

While pretreatment programs are absolutely necessary because they make the producer pay for the cost of the pollution problem being imposed upon society, they are a very expensive way to reduce toxic pollution and they do not solve the problem because there are often no good disposal alternatives. Instead of a water pollution problem, the problem becomes an air or land pollution problem. The senario below illustrates this point.

In order to comply with regulations a typical jewelry company hires a lawyer to tell him what the law requires; hires an engineering consultant to tell him what equipment is necessary; pays a permit fee; buys the equipment; and hires staff to run the equipment, providing the equipment works. If it does not work well, which has often been the case based on compliance records to date, the jewelry company is subject to legal action and fines if noncompliance is found. When the equipment does work, the jewelry company is left with sludge full of metals for which there are sometimes no viable disposal alternatives - a situation that will be in force by August 8 when a land disposal ban for metal-hydroxide sludges goes into effect.

The more obvious alternative to this senario is to reduce the use or production of toxics at the source, or as it is commonly called, source reduction. Several States have intitiated what is more broadly referred to as waste reduction programs. Most notable among them is North Carolina's. But states will only be able to go so far in the promotion of source reduction at the statewide level. The initiative must be nationwide. Currently before the Senate is a bill introduced by Senator Lautenberg titled the Hazardous Waste Reduction Act. As written, the bill would provide $10,000,000 in seed money to create state programs. This bill, which provides the necessary catalyst, focus, and process for getting a national policy of waste reduction off the ground, is long overdue and should be supported. Its weakness is that the level of funding falls far below the Office of Technology Assessment's recommendations that $30 - $45 million per year is needed over the next five years to get waste reduction going. Save The Bay hopes that Congress will respond to the challenge of toxic pollution and allocate the necessary funds.

Apart from the funding issues, Congress must ensure that several steps are taken to get waste reduction off the ground. These steps include: 1) assistance to industry; 2) establishment of an Office of Waste Reduction at EPA to provide national leadership, information analysis, and information transfer; and 3) review of all environmental laws to ensure that source reduction is mandated consistently.

An OTA report titled "Serious Reduction of Hazardous Waste" documents the fact that waste reduction is both practical and economical. The technologies exist but industry is generally spending its time and effort on treating toxic waste rather than investigating ways to reduce it. Escape from this cycle can be facilitated by federal leadership, primarily through education and technical assistance. The result would a reduction in the production of hazardous wastes, which is good for this Nation's Bays and its people.

A second major source of toxics to our water is urban runoff. The grimy black strip on the center of our roads is probably the single greatest threat to our bays. Laden with benzene, lead, cadmium, and a host of carcinogens, these automobile wastes are washed into the Bay and its tributaries with every rain. The cumulative effect is enormous. Further, it is suspected that rainstorms that occur after dry periods have a toxic shock effect on rivers as accumulated toxics run off all at once. This toxic shock effect often results in massive fish kills. Though Congress identified nonpoint pollution as a concern in the new Clean Water Act, more money has to be allocated to address this problem.

The problem facing older coastal cities like Providence is particularly severe. Here, sewers were laid to carry both sewage and stormwater in the same pipe. During rainstorms, the pipes fill to capacity and overflow into our rivers. As a result, two and a half billion gallons of polluted water - a combination of raw sewage and urban runoff - are dumped into Narragansett Bay each year. A mere half-inch of rain in Providence leaves much of the shellfish in Narragansett Bay unsafe and unfishable for a week. One necessary step to correcting this problem is the construction of facilities to address the above-mentioned combined sewer overflows. This will cost more than $300 million in Rhode Island alone.

Finally, air pollution contributes to the toxic pollution of Narragansett Bay. This is a problem which Rhode Island cannot begin to solve itself. One of the major lessons learned at our National Conference was the devastating effect that the deposition of air toxic pollutants is having on the Great Lakes. In areas where there are no known sources of toxic pollution, toxic pollutants have been found in the tissues of marine life, making it unsuitable for human consumption. We urge your support for a reauthorization of the Clean Air Act that addresses this problem.

If we are to succeed in our fight to restore our waters to their proper use, making them valuable recreational, economic and aesthetic resources, we must stop using them as free dumps, the backyards which no one is patrolling.

There are a number of things which Congress can and should do to ensure that these worthy goals are attained.

First, Congress should appropriate monies to EPA to ensure that water pollution efforts that were started will be finished and that underfunded efforts, like nonpoint pollution programs, get initiated This is particularly important for enforcement activities. Congress' time is simply too valuable to be spent creating well formulated environmental laws which are not aggressively enforced. We ask for no less than environmental law and order.

Second, Congress should clarify to EPA its intent to restore our nation's waters by protecting sediments as well as water and by regulating all pollutants rather than a select few.

Third, Congressional leaders must create a Coastal Caucus. Millions of federal dollars are currently being spent to study Narragansett and other bays. Implementation of the recommendations these estuarine projects produce will require your leadership. Narragansett Bay has the support of Senators Chafee and

Pell and Representatives Schneider and St. Germain. More leaders like ours are needed across this land. We need all Congressmen and women representing coastal areas to work in concert for the protection of the nation's most bays and coastal waters.

Fourth, and most importantly, Congress should act now to support legislative efforts to establish a national source reduction program. Rhode Island alone produces 30 million pounds of toxic waste each year. No matter how effective the controls, that waste will pollute the environment as long as it is produced. Leading activists from around the country who gathered in Rhode Island at the conference I mentioned were in total agreement on this point. The only real solution to toxic pollution is to stop producing toxic wastes. It is imperative that Congress take the lead in assuring that this occurs. Only then can we hope to attain the goals we all share for coastal waters: safe food, healthy habitats, and waters worth enjoying.

Statement of Donald F. Boesch

Subcommittee on Environmental Protection
Committee on Environment and Public Works
U.S. Senate

Hearing on Environmental Conditions and Trends in Marine and Near-Coastal Waters

April 20, 1988

Senator Mitchell and members of the subcommittee, I am Dr. Donald F. Boesch, a marine ecologist, Executive Director of the Louisiana Universities Marine Consortium, and current President of the Estuarine Research Federation.

I have been asked to speak to you today on the deteriorating quality of our estuarine and coastal marine environments, particularly those in the Gulf of Mexico. I will comment but briefly on the Gulf of Mexico specifically. Many of my thoughts about the importance of the Gulf and the environmental problems experienced there are included in the Environmental Protection Agency pamphlet *The Gulf Initiative: Protecting the Gulf of Mexico* to which I was a contributor. Copies of this pamphlet have been furnished to the subcommittee.

The pamphlet makes the case that the Gulf Coast, which is by the way almost as long as the eastern seaboard, is the nation's most economically important. It yields 40 percent of the total domestic commercial fishery landings, provides critical habitat for 75 percent of migratory waterfowl, yields 72 percent of the oil and 97 percent of the natural gas produced offshore, and handles 45 percent of U.S. export/import tonnage. One-sixth of the U.S. population lives in Gulf coastal states and these states accounted for 35 percent of U.S. population growth between 1980 and 1985. Nearly two-thirds of the contiguous U.S. drains into the Gulf of Mexico.

The pamphlet goes on to discuss environmental problems experienced around the Gulf of Mexico in terms of Nutrient Over-Enrichment, Toxics and Pesticides, Habitat Degradation, Freshwater Diversion and Public Health. These problems have been generally less well studied and documented than in other parts of the country. The inequity, wherein less than 10 percent of the federal marine environmental research expenditures are directed to such an enormously important part of our bordering ocean, clearly is part of the reason why and should be redressed.

The Gulf Initiative, an embryonic program led by EPA, but involving other federal agencies and the states, has been conceived to provide 1) a mechanism for addressing complex problems that cross state, federal, or international jurisdictional lines; 2) better coordination among programs in order to increase efficiency and effectiveness; 3) a regional perspective in which to address research needs; and 4) a forum for various groups to participate in "solution" of problems.

Much of the testimony at this hearing and the majority of federal programs concern the problems of toxic contamination and eutrophication resulting from point and non-point discharges into coastal waters. The Gulf has its share of these problems. For example, an ongoing EPA analysis has indicated that 12 of the nation's 26 most vulnerable estuaries, in terms potential impacts by toxicants or the cumulative effects of multiple stresses, are located in the Gulf, 10 of these in Louisiana and Texas. This analysis was based on relating estimated loadings of nutrients and toxicants to the flushing rate of the estuaries. The high vulnerability of these Gulf estuaries is a product of the high concentration of industry and low tidal exchange in the northwestern Gulf region.

However, today I want to emphasize two problems not usually addressed under the more commonly expressed concerns of coastal point and non-point sources: **physical habitat modification and riverine** (as opposed to estuarine) **drainage inputs**. Within the Gulf of Mexico and, indeed, elsewhere these may pose more serious and recalcitrant problems than the traditional coastal point and nonpoint source pollutants.

Physical habitat modification.

Despite various regulatory efforts, including Section 404 permitting, we are continuing to experience the physical destruction or modification of valuable coastal habitats, including wetlands, seagrass beds and tidal flats. We do not know what the rates of habitat losses are. In Louisiana, alone, the annual loss of coastal wetlands has been estimated to be 50 to 60 square miles; thus the national total must surely exceed 60 square miles per year. Only 6% of the tidal wetlands of San Francisco Bay remain. Dramatic loss of seagrass beds has been observed in the Chesapeake Bay and Tampa Bay has only 20 percent of its original 76,500 acres of seagrass beds remaining.

Physical loss or modification of habitats, especially of tidal wetlands, is being experienced in every coastal state. This is a problem which cuts across the responsibilities of numerous federal and state agencies. Fully 22 federal legislative mandates assign responsibilities to six federal agencies related to physical loss or modification of marine and estuarine habitats (Table 1). Despite these extensive shared responsibilities the National Ocean Pollution Program Office estimates that only $14 million was expended by federal agencies in FY 1986 in habitat-related research, development and monitoring. This amounted to less than 10% of the total for ocean pollution research, development and monitoring.

These habitat losses or physical modifications are of great concern because these habitats play a critical role in the production and replentishment of living marine resources, including commercial and recreational fisheries, wildlife and endangered species. Furthermore many of these losses, for example losses of coastal marshes, are largely irreversible. While a water body experiencing eutrophication or toxic contamination may recover over a period of time once the offending sources are controlled, a marsh destroyed by dredging or a tidal flat filled in will generally not naturally recover and may be very difficult to restore.

Because of the extent, significance to resources and irreversibility of coastal habitat loss, greater emphasis of this problem is needed in national research, monitoring, and management programs. Particular attention should be directed to mitigation and restoration of physical losses on a variety of scales, from less than an acre to hundreds of square miles, as in the case of the Mississippi deltaic plain. For this we need a convergence of environmental sciences and engineering--coastal environmental engineering, if you will--in which technology is actively applied, working with rather than against natural processes, in environmental protection and enhancement. Stricter regulations alone will not solve the problem.

Table 1. Federal agencies with major legislative mandates relating to physical loss or modification of marine and estuarine habitats (Source: National Ocean Pollution Program Office, NOAA).

Statutes	Agencies					
	USDA	DOC	DOI	DOD	DOE	EPA
Section 404 of the Clean Water Act		X	X	X		X
Section 10 of the Rivers and Harbors Act				X		
Fish and Wildlife Coordination Act		X	X			
National Environmental Policy Act	X	X	X	X	X	X
Emergency Wetlands Resources Act			X			
Magnuson Fishery Conservation and Management Act		X	X	X		
Water Quality Act of 1987		X				X
Anadromous Fisheries Conservation Act		X	X			X
Fish and Wildlife Act		X	X			X
Marine Mammal Protection Act		X	X			
Endangered Species Act		X	X			
Soil and Water Conservation Act	X					
Coastal Zone Management Act		X				
National Sea Grant College Act		X				
Pacific Northwest Electric Power Planning and Conservation Act					X	
Federal Power Act		X	X		X	
Coastal Barrier Resources Act	X		X	X	X	X
Estuarine Areas Act			X	X		
Fish and Wildlife Conservation Act			X			
Fish Restoration and Management Projects Act			X			
Deep Seabed Hard Mineral Resources Act		X				

Riverine drainage inputs.

In many regions of the country inputs of pollutants from rivers entering the coastal zone significantly exceed the point and non-point source inputs directly into coastal waters. Yet our assessment and monitoring strategies and management approaches generally focus on the latter. These regions where riverine sources dominate are among the most productive of our coastal waters, including such areas as the Mississippi delta region, Apalachicola Bay, most of the southeast coast, Chesapeake Bay, Delaware Bay, Long Island Sound, Puget Sound and the Columbia River estuary.

There is recent evidence of alarming increases in the flux of potential pollutants, particularly nutrients, from interior regions of the country to the coastal ocean. For example, a recent analysis of long-term trends of water quality of the nation's rivers by the U.S. Geological Survey showed a dramatic increase in nitrate discharges to the coastal zone (Table 2). In other cases, including some trace metals and phosphorus in some regions, the trend has been reversed as a result of source reductions. Changes in riverine inputs may overshadow any local source reductions, making management efforts to reduce eutrophication, for example, ineffective.

Table 2. Estimated changes in mass loadings of nutrients from rivers to coastal regions of the United States based on trends in riverine concentrations between 1974 and 1981 (R. A. Smith, R. B. Alexander and M. G. Wolman. 1987. *Science* 235:1607-1615).

Region	Percent change in load 1974-1981 Nitrate	Phosphorus
Northeast Atlantic	32	-20
Long Island Sound/N. Y. Bight	26	-1
Chesapeake Bay	29	-0.5
Southeast Atlantic	20	12
Albemarle/Pamlico Sound	28	0
Gulf of Mexico	46	55
Great Lakes	36	-7
Pacific Northwest	6	34
California	-5	-5

Understanding, much less controlling, the source of these river-borne materials is extremely challenging. In addition to waste discharges into rivers and streams, agricultural runoff and atmospheric deposition may be significant sources. The important point to keep in mind is that the most significant environmental deterioration resulting from these pollutant emissions may take place hundreds of miles away in the receiving estuaries and near-coastal waters. The stakes may be high, however, as in the highly suggestive relationship between the doubling of nitrate concentrations in the Mississippi River discharge since 1960 and the 3,000 square mile zone of severe oxygen depletion in near-coastal waters off Louisiana and Texas which is discussed in the Office of Technology Assessment report. Unfortunately, because of the diffuse and daunting nature of such phenomena, which transcend jurisdictional boundaries, riverine drainage basin inputs into coastal waters and their consequences are receiving very little attention in the federal research and management programs.

The research agenda.

Reversing the trends of deteriorating coastal environmental quality resulting from physical habitat modification and riverine drainage inputs, as well as the more familiar coastal pollution sources, will require a much improved understanding of environmental processes and the effects of changing conditions on ecosystem productivity and integrity. I feel strongly that this will not happen simply by increasing the level of effort of research, development and monitoring. New approaches will be required which not only employ technological innovation but involve new organizational models in order to overcome the piecemeal, parochial and myopic characteristics of past efforts. These new models include 1) regionally planned and coordinated research and monitoring; 2) focused, interagency research tied to critical management questions; and 3) nationally coordinated studies with a strong comparative emphasis. Examples of each in various stages of planning are given below.

The aforementioned Gulf Initiative is an example of a program which promises efficient translation of results of research within a large region as opposed to unconnected piecemeal efforts. An example of the limitations of the piecemeal approach is provided by an ongoing evaluation of marine environmental monitoring in the Southern California Bight, which is a component of a National Research Council study which I chair. A conservative estimate of $22 million per year is spent by public agencies and utilities for marine environmental monitoring. Most of this is "end of the pipe" monitoring, which, while technically competent, is uncoordinated and is perceived by virtually all parties as insufficient to answer four basic questions:

Is it safe to swim in the ocean?
Is it safe to eat local seafood?
Are fisheries and other living resources being protected?
Is the health of the ecosystem being safeguarded?

In Southern California, we found that regulators, dischargers and the technical community are all frustrated with the current approach and are willing to seek a better way to approach these questions through coordinated regional monitoring and research. The regional marine research center concept on which Senator Mitchell's proposed Marine Research Act of 1988 is based could provide such a mechanism.

Some coastal environmental problems are of such a crisis proportion as to merit a mini-Manhatten Project, an intense dedicated effort toward specific management goals. An example is the wetlands loss problem in Louisiana for which solutions are being desperately sought. At risk are future, irreversible losses and the prudent and effective expenditure of billions of dollars of public and private resources to stem the losses. In response to the directives of Senate Report 100-165, the U.S. Geological Survey and Fish and Wildlife Service have developed a plan of aggressive and coordinated studies of wetland erosion processes and marsh management practices over a five and one-half year period. I urge the Senate to support the implementation of this program in FY 1989.

Finally, the federal and academic research communities are in the process of developing nationally coordinated programs which promise major breakthroughs in our understanding of estuarine and coastal marine ecosystems and their role in supporting living resources. The National Oceanic and Atmospheric Administration is working on plans for the technical implementation of its proposed Estuarine Research Program in which it will initially emphasize the relationship of habitats, such as salt marshes and seagrass beds, to production of living marine resources. The National Science Foundation is this year taking the first step in implementing an initiative on the Land-Sea Interface. The primary objective of this program will be to understand how changes in the fluxes of critical materials from the landscape, including nutrients, sediments and potential toxicants, affect coastal ecosystems. Although scientists have long been working on these issues, the potential of quantum advances is offered by approaching them through carefully coordinated, sustained, and parallel studies in representative systems--northern and southern, east coast, gulf coast and west coast, coastal plain, lagoonal and deltaic estuaries.

In summary, we find ourselves at an intersection of the unprecedented need for information and the technical opportunity to make major strides in our practical understanding of coastal ecosystems. We ask for the support of Congress in providing the sustained funding needed to realize this opportunity. In return, Congress should demand more effective interagency coordination, the putting aside of parochial concerns to implement new regional and national approaches, and more focused attention to such major, tough problems as physical modification of habitats and riverine drainage inputs.

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Testimony of Kenelm W. Coons, before the Senate Subcommittee on Environmental Protection, Environment and Public Works Committee;
April 20, 1988

I am Kenelm Coons, Executive Director of the New England Fisheries Development Foundation, a broad based New England trade association of fishermen, processors, importers, exporters and distributors of seafood.

Before appearing today, I talked with experienced commercial fishermen from Boothbay Harbor, and Portland Maine; Portsmouth, New Hampshire; Gloucester and New Bedford, Massachusetts, Pt.Judith, Rhode Island and a lifelong shrimper from Charleston, South Carolina. I have also just attended an informational meeting on dumpsite 106, organized by Capt. George Whidden in Groton, Connecticut and a national workshop designed to develop better standards for handling and processing of shellfish to prevent contaminated seafood from entering the food supply. During that shellfish conference I had the opportunity to talk with a person who has been working for several years on classification of water quality in shellfish growing areas. I have also talked with Judy Capuzzo at Woods Hole Oceanographic Institute.

From these talks and my own impressions during the past fifteen year in the seafood industry on the East Coast, I conclude the following:

1. The effects of pollution seem to be more apparent on the inshore stocks and the species which spawn in estuarine waters; for example, blackback flounder, bay quahogs, soft shell clams and bay scallops.

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2. Even among those species which seem to be most vulnerable to present levels of pollution, it is possible to rebuild stocks quite rapidly through a combination of careful management, vigorous enforcement, investment in improving water quality and protection and restoration of habitat.

The apparent recovery of the striped bass, assisted by legislation introduced by Senator Chafee, is a case in point.

3. We seem to lack the knowledge to determine the relative importance of habitat, water quality and management in rebuilding a stock of fish.

4. Surveys of water quality on the East Coast show industrial harbors like Boston, New Haven and New York to be severely polluted. Conditions in these harbors are like the canary in the mine and could have far reaching effects if not reversed. Fortunately, the investment is being made now to clean up Boston Harbor. Substantial progress is being made in Chesapeake Bay and I understand that the Potomac river is exhibiting more healthy levels of plant and animal life.

Despite the reported pollution of Boston Harbor, there is an active recreational fishery there. It is my impression that we don't really know what the links are between PCBs, PAHs and public health.

5. While the offshore stocks do not yet show widespread affects of pollution; clearly, ocean dumping must have some deleterious effects. Dumpsite 106 was chosen because it is beyond the shelf break in an area of known strong currents, thought to be ideal for dispersal of waste. However, offshore lobstermen fishing the canyon walls and offshore draggermen are finding lobsters and crabs with shells which appear to be spotted with burn marks from the materials being dumped.

Fishermen working in the area express concern over short dumping and comingling of prohibited wastes.

Most commercial fishermen do not favor any form of ocean dumping and have no confidence that once a permit is issued, the contents of the barge will be carefully monitored or that unlawful short dumping will be controlled. (There are, of course, electronic devices which could be used to monitor the position of a barge.)

6. It is important to continue your support of management of fish resources at the state and federal levels and to preserve the regional fishery management councils. Cynics might tell you that the groundfish stocks are declining because of pollution and overfishing and soon there will be nothing left to manage so why bother with management at all; but it is not too late. In fact, not only is there evidence that striped bass are recovering but, for two years now, there has been a resurgence of small cod off Nantucket Shoals and even the haddock stocks seem to be recovering in some areas. Sea scallops are another example of a recovering stock all along the East Coast along with the calico scallop recovery off Florida.

I think many fishermen would tell you that it's intensive and sophisticated fishing effort and not a failure of the ocean to be able to support marine life that is responsible for the low landings of some of the most popular species.

The decline in landings of many popular species does not tell you why those landings are declining. They do not reflect the increase in effort. The typical 60 foot to 80 foot New England dragger (of which there are many more and better equipped vessels than ten years ago) is only catching about 100 pounds per hour. But the demand for traditional groundfish species is so high that this hundred pounds of fish is worth $150 - $250. So it's worth it to keep fishing.

Also, the abundance of other species for which there is a low, or very limited market; for example, illex squid, red hake, whiting (silver hake) and dogfish, is relatively high. (That's why I feel it is important to keep export marketing programs and full utilization priorities alive in programs like the Saltonstall-Kennedy industry grants program.)

7. From a pulic health standpoint, I think the major concern on the East Coast and Gulf should be for shellfish.

The water quality standard by which waters are classified and opened or closed today for shellfish was developed in the 1920s as a protection against cholera. Better indicators are needed to identify viral contaminants. The development of more accurate water quality indicators will not only protect public health but may also open some highly productive areas.

8. Many of you represent coastal states with important fishing constituencies. At the same time that we gather support for cleaner waters and closer control over product safety, we also have to be careful not to sensationalize the situation in such a way that the public loses confidence in seafood.

Seafood offers the American public one of the best sources of high quality protein and the benefits of marine lipids which, at the very least, reduce the risk of heart disease and, as research continues, may also be found valuable in certain types of cancer, multiple sclerosis and arthritis.

Despite the progress we are making in exporting seafood, we still import over two thirds of our seafood. Norway, Iceland and Canada promote the fact that they harvest in clean, clear water.

The reputation and competitiveness of U.S. produced seafood could be injured by a market perception that our seafood comes from polluted water as a result of sensationalised reporting of isolated incidents.

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9. In gathering information for this testimony, I have been struck by the lack of knowledge regarding estuarine and marine pollution. I was told that there is not a clear understanding of the effects of toxins in the food chain. When diminished fecundity is observed, scientists can't really tell you why. The debate over ocean dumping illustrates the lack of undestanding of the effects of dispersal dumping. The pollutants in a dumpsite like 106 may be concentrated up the food chain until dangerous levels may be reached in fatty, long lived pelagic species.

10. I do not have the knowledge to assess the existing and potential environmental effects of pollution. We lack sufficient information to be able to separate out pollution effects from other factors like fishing effort, water temperature, predation and the like. It is only in grossly polluted waters that you find fish with fin rot and tumors.

Clearly, in dumping at sea, it is important to understand the effects better than we do now so we aren't just transporting the problem over the horizon to suffer the effects later. At present, it is the recreational fishermen and the weekend shellfish harvester who is most at risk, not the commercial harvester or the commercial digger of shellfish who is either digging in approved areas or taking the product to an approved depuration facility.

11. A coordinated regional approach to focus existing research capabilities on estuarine and marine pollution problems is clearly needed. It is my impression that EPA lacks the data required to manage ocean dumping safely. Coordinated research which takes advantage of existing expertise could contribute to greater consistency between EPA and FDA. S-2068, the Marine Research Act, would establish these coordinating mechanisms on a regional basis and seems like an efficient way to address the present confusion and lack of solid information I have described.

Thank you for this opportunity to comment.

WRITTEN STATEMENT

BY

WILLIAM G. GORDON
EXECUTIVE VICE PRESIDENT
NEW JERSEY MARINE SCIENCES CONSORTIUM

ENVIRONMENTAL QUALITY OF MARINE AND NEAR-COASTAL WATERS

SUBMITTED TO THE SENATE SUBCOMMITTEE ON
ENVIRONMENTAL PROTECTION

U.S. SENATE
APRIL 20, 1988

Date: April 7, 1988

Presentation of William G. Gordon
before
Senate Subcommittee on Environmental Protection
April 20, 1988
Room 406, Dirksen Building

Good morning Mr. Chairman, I am William G. Gordon, currently Executive Vice President, New Jersey Marine Sciences Consortium. The Consortium is an educational and scientific alliance of 28 colleges and universities located in New Jersey, New York and Pennsylvania. I also recently served as Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration, an agency in which I served for over 30 years so I can recognize the importance of clean water to our Nations fishery resources and to the industries which depend upon them for their livelihood. I appreciate the opportunity to appear before you to discuss environmental concerns facing this Nation.

First, I'd like to review the environmental insults which occurred off New Jersey during 1987. While not catastrophic, they are symptomatic of the long-term slide toward degradation and eventual destruction of the values we place on our marine and coastal areas. It was a bad summer, like too many other summers. There were three major garbage washups and a couple of minor ones, resulting in beach closures in New Jersey and Long Island. In one instance the garbage included medical wastes.

In apparently an unrelated but equally distressing incident, hundreds of dead dolphins washed ashore along the coast from Virginia to New Jersey and later to Florida. Pieces of wood washed ashore and in September tar balls. The TV and other press hosts spent alot of time nationally depicting the bad luck of New Jersey. In spite of the fact that disposal of garbage was made illegal under President Roosevelt in 1934 some still finds its way into the sea.

The garbage washups were probably a result of illegal dumping, outflows from stormwater drains, poor trash retention while enroute to landfills, by pass from wastewater treatment and other sources which include beach goers, marinas, pleasure boaters and commercial traffic of ocean going vessels including military. I believe that combined sewer outflow is largely responsible for the chronic problem of floatables in the mid-Atlantic Bight. Solution to this problem lies with the States and local governments and must include better street cleaning, redesigned sewage collectors, screening of all stormdrains, better maintenance, less littering by the public, and public education.

The illicit dumping of garbage particularly medical waste into the ocean will require state and local controls similar to federal control for hazardous waste, -- that is a "cradle to grave" manifest system that tracks the movement and holds generators of such trash accountable and provides for strong disincentives for violation.

There are five ocean dumping sites in the mid Atlantic currently being used by dumpers operating under permits issued by EPA under the law. These are the Acid Waste Dump Site, the Deepwater Industrial Waste Dump Site, the Mud Dump Site, the Cellar Dirt Site, and the one municipal

sewage sludge dump site, the 106-mile deepwater sludge dump site to which all sludge dumping was transferred after December 31, 1987. The phase-out of the 12-mile site used since 1914 for the disposal of municipal sludge, is one of the more significant ocean initiatives in which EPA was involved. After December 31, 1987 the 12-mile site can not be used again. Thus we have phased out one coastal site but in essence moved sludge offshore to the 106 site. The permit for this site expires at the end of three years. I do not believe this should be renewed without radical modifications.

In passing the Marine Protection, Resources, and Sanctuaries Act, Congress stated a policy to strictly limit ocean dumping of any material which would adversely affect human health, welfare, or amenities, or the marine environment. EPA must therefore maintain a strong bias against ocean dumping in its regulations and criteria for evaluating ocean dumping permit applications. The regulations require that a permit for ocean dumping of any material not otherwise prohibited can be issued only if the permittee can demonstrate that there are no alternative disposal methods or process modifications available which are A) technically feasible, B) economically reasonable, and C) likely to have less impact on the total environment than ocean disposal. In other words, ocean dumping is not a primary waste disposal alternative, but only an option to be used only if the activity meets the environmental impact criteria and there are no other feasible options available or, more easily said, as a last resort.

There are several reasons we should reevaluate our present regulations and laws. There is a growing concern about the fact that once something has been disposed of in the ocean, we have essentially no control over it any more. There it is, for better or worse. Land disposal has it's problems, too; grave problems. But at least if a landfill leaks, or a substance needs further treatment, it is available for us to have another crack at. Not so in the ocean -- its there period!

The fishing industry sees evidence that the 106 site is not the place. Fishery resources and thus their livelihood, and perhaps human health are being impacted. We are seeing more lesions and fin rot on fish and shellfish species which inhabit or swim through this area. No one clearly understands the problem but one thing is for certain. We are overstressing the environment.

It is an undesirable environmental policy, simply to throw something away. The public unfortunately has an "out of sight, out of mind" disposal mentality from the beginning of time. Sewage treatment may not be perfect, high-tech incinerators may only burn 99.99 of toxic substances, releasing the other .01 percent into the atmosphere, landfills may leak, but at least in all of these methods something is being done either to alter the waste, or separate it from the environment. Ocean dumping is neither treatment nor separation: It's Dumping!

There is the uncertainty factor. According to present information on the substances monitored, and the impact studies conducted, the materials now being disposed of in the ocean under the law have no significant impacts on human health or the marine environment. But there is a strong feeling that the extent of knowledge is too limited. Within the limits of the tests, the short-term impacts appear minimal. We know, for example, that when hydrochloric waste goes into the ocean, the acid is neutralized within minutes by the buffering action of the ocean. But what is the effect over great periods of time? What is the long-term environmental impact of ocean disposal of municipal sludge? We simply don't know all the answers. Ocean disposal is a throw-it-away disposal of wastes, whose long-term impacts are unknown and perhaps irremediable. This is why we have seen so many groups calling for its termination.

However we must realize that it is very difficult to put a halt to an operation that disposes of approximately 8 million wet tons of municipal sludge a year, unless you have someplace else for it to go. The same goes for the roughly 59 thousand wet tons a year of hydrochloric acid waste dumped at the acid dump site. At the same time it is very difficult to start up a system for disposing of those kinds of volumes, from scratch, or, from a position of rest.

We can outlaw dumping tomorrow if we like, but that material will still go in the ocean because it has no place else to go. Sufficient force has not been directed toward sending it somewhere else. Most of the energy has been dissipated in objections to where it is going now. Without an alternative, there is no possibility of that opposition having any effect.

No revised regulation is going to enable the various New York State and New Jersey sludge dumpers to find, all by themselves, a new place to put 8 million tons of municipal sludge a year. And that figure, incidently, is not going to shrink as the years roll by, it's going to grow. We must all participate in the search for alternatives; dumpers, EPA, States, municipalities, ocean groups, and citizens alike.

Alternatives do exist. Inland cities have them. The mid-Atlantic is the only region in the entire country in which ocean dumping takes place. Other cities landfill their sludge; many cities incinerate it; some treat it again and then incinerate it; some compost it with other materials and sell it as fertilizer and soil conditioners and make a profit.

In each option there is a drawback; because there is no environmental free lunch. Even with the finest state-of-the-art burn technology, we discharge some pollutants into the air and end up with ash containing heavy metals. Putting sludge in the land has its bad points too. Considerable pretreatment may provide a better solution, but whatever route we choose, we can be sure of three things: It won't be perfect, there will be opposition from one corner of the nest, and it will be expensive.

Floatable materials have also degraded the coastal environment. Floatables consist of a variety of debris from a variety of sources. They can be classified in a few major categories such as glass, kitchen wastes, paper, plastics, styrofoam, and wood, but these categories do not help to explain the types of objects that are typically found. Common floatable items in each of these categories are listed below:

Glass:	Bottles, jars, glass fragments
Kitchen wastes:	Preparation refuse, uneaten food, bones
Metal:	Beer and soda cans, other cans, wire

Paper:	Cardboard boxes, bags, plates, newspapers
Plastics:	Household containers, tampon applicators bags, 6-pack wrappers, toys, condoms
Styrofoam:	Various packaging and household products
Wood	Driftwood, lumber, crates

There are other easily identifiable types of floatables that can be categorized by source type. Hospital wastes (syringes, dressings, intravenous fluid packs, etc.) originate from hospital refuse which is required by both New Jersey and New York State Law to be incinerated. Sewage related floatables are any items that result from objects being flushed down toilets - tampon applicators, disposable diapers, condoms, tampons, and sanitary napkins.

Floatables originate from many sources including debris left on beaches or discarded from boats, overflows from primary sewage treatment plants, combined sewer overflows and storm drains, transfer and transport of municipal and industrial refuse, decay of wharves and pilings, storm runoff carried by rivers and streams, and illegal discharges and dumping. However, the relative contribution of each of these sources to the occurrence of floatables on beaches, particularly to specific floatables strandings, is essentially impossible to determine after the fact. One reason for the inability to trace floatables to their source is that each possible source can contribute essentially the same kind of objects.

Floatables in part will be dealt with by implementation of Annex V of MARPOL. However other action will be needed to make this effort fully successful. It will be everyone's responsibility. Most importantly coastal towns and cities must by encouraged to carry out effective efforts to contain trash -- better street cleaning, control of storm drains, beach clean-ups and similar strategies. This must involve inland municipalities as well since in New Jersey alone there are over 5,000 storm drains which empty into a waterway. All are capable of transporting floatable materials into the coastal waters. These can and must be dealt with by local and state governments.

In my view the environmental problem in the marine and coastal area is serious. Serious and in some instances becoming more so. We are assured that the waters are safe to swim in and that fish and shellfish are safe to eat. I am more concerned about what you can't see. Too often PCBs and a wide variety of substances have been poured into our coastal and inland waters and these invariably find there way to the sediments and water column of our coastal and marine waters. Our estuarine and coastal areas, particularly those near industrial complexes have become major repositories for such compounds. It is within these areas where fishery resources are most heavily impacted. However, increasingly fishermen are bringing ashore catches of fish from deep-water -- areas - well offshore - showing increased evidence of environmental stress. We may well have reached the point of overtaxing vast areas of coastal marine waters.

Environmental degradation is and will continue to have serious social and economic consequences. Although antidotal for the most part, there is ample evidence to demonstrate that losses are occurring.

Since early this year I have been serving on a Blue Ribbon Panel appointed by Dr. Richard Dewling, Commissioner of the New Jersey Department of Environmental Protection. He asked that the members of the Panel address the cause and effect caused by the environmental insults of last summer. As a part of this review we held public hearings to gather evidence and hear the views of the public on these events. People from virtually every coastal community provided their views and some attempted to quantify losses. Without doubt the events of 1987 cause considerable short-term disruption. Only the future will determine if they are longer-term.

Clearly the Federal agencies responsible for threats to environmental quality of marine and coastal waters are not doing their job. I would ask "who's in charge?" An area of great concern to me that needs addressing is the current diverse nature of the agencies responsible for ocean issues. Presently ocean and fishery responsibilities are scattered among nine (9) executive departments and thirty-eight (38) federal agencies, various states, marine commissions, Indian tribes and marine constituencies. The general public must deal with multiple agencies, regulations, and bureaucracies. In my view the Nation can no longer afford or tolerate the inefficiencies, misapplied human and financial resources inherent in the current system. Perhaps the focus on environmental issues should begin by establishing clean cut responsibilities and authorities. The second step would be to provide the resources necessary to do the job. Our coastal resources are too priceless to allow further destruction.

All levels of government need to take concerted action to respond to environmental problems in our marine and coastal waters. EPA, NOAA and the Coast Guard must be provided with the resources to do those jobs already assigned to them. Congress should clarify mandates and if necessary create a consolidated agency so that responsibility and accountability is clearly established. States and local governments can do much to provide for effective sewage disposal, require recycling and waste reductions, control point and non-point pollution sources, regulate toxic materials and so on.

A great force will be needed to stop the momentum of the present disposal methods, and to start new ones in motion. There is a great force and at this very instant that force is peacefully dispersed in such innocuous pursuit as doing the supper dishes, walking the dog, reading the newspaper, or watching TV. Once committed, once organized, that force holds in its grasp the power to make alternatives either impossibilities, or realities.

What this all really comes down to is the pressing need for our society to begin looking at waste management from a wider perspective. It isn't a question of ocean disposal here, and incinerators there: we produce a great deal of waste of various kinds, and it must all be managed.

Again, thank you for this opportunity to express my views. I would be pleased to respond to questions.

PRESIDENT'S CORNER

Stanley A. Moberly

MORE RENT

Those who use our fishery resources should pay for the right. Let's call it rent. Rent, simply defined, is payment made for the right to use property of another. Most of us associate the term with housing. We pay a monthly fee in exchange for a place to live that's warm and dry and properly maintained. This type of contractual agreement is simple to understand. Why shouldn't the same concept apply to those who benefit from our fishery resources?

Almost everything we need to get by in this world has to be paid for, there's a *quid pro quo*. But when it comes to government fisheries policies even the simple rules of the marketplace don't seem to apply. Why doesn't the government charge adequate rent for the use of the resource? How many times have we been told that there's not enough money to manage the resource in the way we all know it needs to be managed? Why, considering the value of the resource and the money derived from its harvest, don't we charge enough rent to fund adequate management programs? I think it is about time "we start doing more with more." Refusing to collect rent to at least cover the costs of resource management and research is silly.

In many areas *no* public dollars are allocated for the management and maintenance of the recreational fishery. The only funds available are those generated by license fees and excise taxes on fishing equipment. Lawmakers don't seem to realize that recreational fishing activities generate significant economic activity, the impact of which is far greater than the dollars invested. While sport fishermen pay for almost all the cost of the recreational management program, I cannot think of a single jurisdiction—not one—where the amount of money collected is entirely adequate.

In marine waters, where most commercial fishing activities take place, the situation is depressing. Legislation in the United States prevents the government from charging fishermen any fee except that necessary to cover the cost of issuing the fishing permits. All funds necessary for enforcement, management, and research come from the general fund and then only after lawmakers are once again convinced that appropriation of a modest amount of money for such activities is warranted. The Canadian marine management program is also not adequately funded. This annual ritual is a frustrating and unrewarding process.

A review of the recent funding record for federal fishery programs reveals how poorly this system works. Most of our commercial fisheries are not economically viable on a long-term basis. Somehow we have managed to create a system of open entry for an insignificant fee resulting in a product (of questionable quality) at a very high cost. Please don't misunderstand me. The fishermen are not getting rich either. We cannot blame the fishermen for following rules and policies set down by the government. The responsibility for this unfortunate circumstance rests, at least in part, with you and me. But the responsibility for less than adequate achievement in the area of resource management rests with our elected representatives. I, for one, want to see an end to the free ride and the beginning of a program that allows for those who benefit from the use of the resource to pay with their dollars and their support for the cost of effective management.

Saying this, of course, does not mean that it will come about. If a new spirit of cooperation is going to take hold, if fishermen are to be compelled to pay the true costs of resource management, then there will have to be a *quid pro quo*: participation in the resource management decision process.

Those who benefit from the use of the fishery resource must share the responsibility for its management and maintenance. That's fair! You and I both know that before fishermen will agree to abide by a new, different, and more expensive approach, they must be convinced that it is in their best interest to do so. Without adequate funding right from the start, acceptance of a new management system is doomed. Without user participation in management decisions, the new program, no matter how it's funded, is likewise doomed. But if government can "prime the pump" and if we can agree to share management decision making with the user, the economic and social rewards will support the cost of an effective management program.

When we develop comprehensive plans for the resource, we must include the user as a legitimate partner in the drafting process. Involving the user in the strategic part of the comprehensive planning will make us aware of their social and economic needs. They in turn will become aware of what the resource is capable of producing and how sound management can be achieved. When we move from the strategic phase and on to the implementation phase, we'll have a better grasp of what projects will best meet resource and user needs. Designing projects is one of the most visible and powerful ways to influence the use of the resource.

In my September–October "President's Corner," I explained why I believe social and economic resource information is so important. Armed with this information we can develop comprehensive plans that are *visible* and *believable.* Once users become convinced that they are an important and integral part of the process, they will become our most loyal constituents, a powerful force in support of the funding necessary for effective resource management.

I have observed some new and innovative methods of collecting MORE RENT. In Texas, I witnessed a program where fishermen raised money for the construction of a new hatchery. Housed together in this new facility, on either side of a large public viewing and education area, were the state fish culture staff and the university researchers—one project serving multiple purposes, dedicated to improvement of the resource. It is great to see. Included as part of this project is a feedback system, designed to demonstrate to both the user and the public that the intended "goods and services" are indeed being delivered. A satisfied user and a well-informed public will make the next project easier to fund and implement.

In Wisconsin, I observed a private corporation assist in the distribution of fisheries information by producing a poster of local fish species. In Texas, another corporation co-sponsored a project with the state hatchery program.

Many companies, some not even remotely connected to the fish business, give their support by making research grants and contributions to foundations that conduct fisheries research. Some companies depend on fisheries for their economic well-being. Many of these already support the resource in some way. I believe that this is another potential source of support for adequate resource management funding. These companies would react in the same way as the fishermen if they were part of the process.

It is my belief that there are several innovative approaches to collecting MORE RENT and that those directly involved in the fishery are not the only sources of support. Fishery professionals, working with users, businesses, and community organizations can help collect the necessary dollars and secure the support necessary to effective resource management. Projects developed and implemented with this partnership approach in mind will give us a better informed public, a happier consumer, and a more satisfied fisherman. In addition, the resource will be better off and I for one will not be so frustrated. MORE RENT can help bring about this change.

Study Recommends Federal Fisheries Reorganization

AFS asks, "Where's the fish?"

By William G. Gordon

J.F. Scarola

Overfishing and habitat degradation caused the near-demise of, among many others, the Atlantic salmon.

Like the now famous hamburger advertisement, "Where's the beef?" it is sometimes hard to find the fish—that is, in the federal government. Responsibility for fishery programs is fragmented among 37 federal agencies, contributing to unclear national policies, overlapping jurisdictions, competition for inadequate funds, bureaucratic inertia, and lack of leadership, according to members of the American Fisheries Society (AFS).

In the early 1980s, AFS became concerned over what appeared to be the federal government's inability to carry out mandated freshwater and marine fishery responsibilities. As a result, the society established an ad-hoc Federal Fisheries Responsibilities Committee, chaired by John P. Harville, past director of the Pacific Marine Fisheries Commission, to review the distribution of federal fishery authority and the rationale for the distribution.

The Harville committee identified 12 troublesome issues, ranging from management of common property resources to accountability and efficiency of governmental programs and organization. Among other recommendations, the committee's report called for consolidation of primary fishery functions into a single federal fishery agency and a new emphasis on management, enforcement, and research at the federal level.

The Management Issue

Under current federal government stewardship, fishery resources are considered "common property," unowned until captured. This tends to encourage more people to engage in fishing than can be sustained by the resource or the economy. Economic pressures force harvest under almost any circumstance, with consequent overuse of the stock. The commercial fishing fleet has become both overcapitalized and underutilized as the industry acquires better and better equipment to seek fewer and fewer fish. As a result, there are tremendous social, economic, and political pressures at various governmental levels to aid the fishery industry through grants, low-interest loans, and the many other tax-supported subsidies. This support may take the form of fishery development grants, dock construction, reduced docking fees, uncompensated U.S. Coast Guard support services, guaranteed loans for high-risk ventures, fuel tax rebates, and similar devices.

In 1976, Congress passed and President Carter signed into law the Magnuson Fishery Conservation and Management Act. Its purpose was to provide the legal basis for a national effort to conserve and manage fishery resources, prevent the depletion of fish stocks, rebuild overfished stocks, protect fish habitats, and manage fishery resources to their full economic and social potential. In the 12 years since the act became law, implementation of the act has been lacking, partly because of poor definition and poor assignment of policies, roles, and responsibilities in both federal and state governments.

The bulk of fishery management responsibilities resides with the states, Native American tribes, and two principal federal fishery agencies: the USDI Fish and Wildlife Service and the National Marine Fisheries Service (and through it to 8 regional councils) in the Department of Commerce. Six other federal agencies have major fishery or fish habitat responsibilities and another 29—ranging from the Minerals Management Service in the Department of the Interior to the Agriculture Research Service in the Department of Agriculture—have some related resource responsibilities.

Dispersed and fragmented fishery conservation and management responsibilities have resulted in

- no clear accountability for decisions that prevent scientifically sound management initiatives;
- no coordinated national aquaculture or fishery management plans;
- inability to predict when habitats

or stocks will be overly stressed in time for corrective action;

- inability to allocate resources equitably among user groups; and
- lack of clearly defined roles for federal, state, tribal, and other management entities, particularly in matters of shared responsibilities.

The Resource Issue

Fishery resources, both freshwater and marine, are an enormous social, economic, environmental, and recreational asset. Their continued availability is essential to human health and nutrition, environmental quality, economic prosperity, and leisure enjoyment.

In 1986, the U.S. commercial fishery industry caught 8.7 billion pounds of edible and industrial fish worth $2.6 billion dockside and with a consumer value in excess of $6.2 billion. Commercial fishing provided 85,000 full-time and 110,000 seasonal jobs, and supporting industries employed more than 300,000 people. More than 126,000 vessels were involved, and their products were handled in 3,600 shore establishments.

Despite these impressive domestic landing figures, imports of edible and nonedible fishery products continue to increase. In 1986, these imports stood at a record $7.6 billion. Fishery products are second only to crude oil and petroleum products as a contributor to the nation's trade deficit. With the growing demand for seafood and the diminishing domestic resource base, fishery product imports will most likely continue to increase under current federal policies and practices. With proper management, enforcement, and research, however, fish stocks can be maintained at population levels that, over the long term, will provide maximum food, recreation, and revenues without having to rely so heavily on imports.

For an increasing number of Americans (more than 64 million in 1985, the most recent year for which figures are available), recreational fishing in coastal and inland waters has become a popular outdoor activity. Sport fishing generated more than $28 billion in retail sales in 1985 and created more than 590,000 jobs. Of that total, $10 billion was generated by marine anglers alone.

For 2 centuries, this nation's fishery resources have been managed as though they are inexhaustible. The record, however, is etched with many examples of overfishing and habitat degradation. They include serious declines of herring, haddock, and cod fisheries off New England; a precipitous decline of king mackerel in the Gulf of Mexico and the south Atlantic; the near disappearance of kelp bass in the southwest Pacific; the near extinction of Atlantic salmon in New England before partial recovery at tremendous expense to the taxpayer; the near demise of striped bass in the Chesapeake Bay; a troubled redfish population in the Gulf of Mexico; and serious problems for nearly all species of billfish. In the Great Lakes the story is very similar: Species such as lake trout, whitefish, perch, and blue pike are best described as troubled or, in the case of blue pike, extinct.

Fish habitat is degraded from agricultural, industrial, and municipal pollutants. It is destroyed by dredging and filling for urban development, and it has been lost to other land and development purposes. A study reported by *U.S. Water News* in February 1986 found that 41 percent of our streams, 53 percent of our lakes, and 28 percent of our estuaries were contaminated by nonpoint-source pollution. Wetland losses have averaged 458,000 acres annually, the equivalent of losing half of the state of Rhode Island each year. Wetlands are not only important spawning and nursery habitats, but they are also key indicators of the health of the nation's aquatic systems. Wetlands help prevent flooding, provide for aquifer recharge, and help filter pollutants and sediments.

AFS Strategies for Action

In this context, the American Fisheries Society has set as a major priority the implementation of the Harville report through the Federal Fisheries Responsibilities Committee. The plan, adopted by AFS's executive committee, projects a three-part initiative over the next several years.

First, the committee is working to develop effective contacts with key congressional representatives and their staffs to discuss reorganization goals and the necessary legislative initiatives to bring about such a reorganization. A briefing was held last December to explain the committee's concerns and to encourage oversight hearings. AFS is supporting enactment of a bill (H.R. 1171 and S. 562) that would establish an Ocean Policy Study Commission. AFS believes enactment of this legislation would provide an excellent opportunity for review of the plight of the nation's marine and Great Lakes fishery resources and the need for a revitalized federal program. The House of Representatives passed H.R. 1171 last year, and Sen. Ernest F. Hollings (D-SC) has indicated that the Committee on Commerce, Science and Transportation will be holding hearings early this year.

Second, to encourage federal actions in support of improved management of fishery resources and related habitats, AFS committee members have met with officials in the Interior and Commerce departments. Reactions have been positive. In addition, committee representatives have discussed the issues with the President's Office of Management and Budget examiner for commercial and marine sport fishery programs. Plans are under way to schedule similar briefings with the federal budget examiners for other fishery and related habitat programs. In further support of the initiative, the December 1986 report of the President's Commission on Americans Outdoors recommended a single federal fisheries agency to solve what it viewed as the problems inherent in the fragmentation of fishery programs.

Finally, the AFS committee is attempting to establish a broad base of public support for the reorganization. To achieve this, an alliance of interested individuals and organizations is being formed. Funding for the alliance is being solicited and a newsletter is being produced. Those interested in receiving the newsletter or in becoming otherwise involved may contact AFS at 5410 Grosvenor Lane, Bethesda, MD 20814 or call (301) 897-8616.

William G. Gordon is chair of the AFS Federal Fisheries Responsibilities Committee. He is also executive vice-president of the New Jersey Marine Sciences Consortium, an educational alliance of colleges and universities in Pennsylvania, New Jersey, and New York.

THE MARINE RESEARCH ACT OF 1988

THURSDAY, APRIL 28, 1988

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:08 p.m., in room 406, Dirksen Senate Office Building, Hon. George H. Mitchell (chairman of the subcommittee) presiding.

Present: Senators Mitchell, Lautenberg, Chafee, and Durenberger.

OPENING STATEMENT OF HON. GEORGE J. MITCHELL, U.S. SENATOR FROM THE STATE OF MAINE

Senator **MITCHELL**. Good afternoon, ladies and gentlemen. Welcome to today's hearing on the Marine Research Act of 1988.

This legislation which I introduced with 16 of my colleagues is intended to protect our Nation's marine and coastal waters through increased scientific research and assessment.

Last week, this subcommittee held a hearing on environmental conditions and trends in marine and coastal waters around the Nation. Witnesses at the hearing agreed that coastal waters face significant environmental problems.

The Congressional Office of Technology Assessment offered the stark conclusion that in the absence of additional measures to protect our marine waters, the next few decades will witness new or continued degradation in many coastal waters around the country.

Just recently, we learned of a new threat to the environmental quality of coastal waters, acid rain. A report by the Environmental Defense Fund concluded that air emissions of oxides of nitrogen are significant contributors to eutrification of coastal waters and that 25 percent of all nitrogen from human activities in the Chesapeake Bay originates in acid rain.

The growing evidence of decline in the quality of coastal waters is especially troubling in light of the tremendous environmental and economic value of this marine resource. The total value of our fisheries is estimated at over $12 billion, and many coastal areas depend upon recreational activities which are based on clean coastal waters.

The concerns expressed at last week's hearing were similar to those I heard from witnesses at a field hearing in Maine last year. The general conclusion of the hearing was that the Gulf of Maine is still very clean and does not face the serious pollution problems of many other coastal waters. There was agreement, however, that prevention of problems in the future will require a first-rate scientific research program.

The legislation we are considering today is intended to expand and strengthen research of our marine and coastal waters. The bill provides general authority to establish 10 multi-State regional marine research centers. The basic objective of the marine research centers will be to support and coordinate marine research at the regional level.

The centers will be made up of marine research institutions working in each region, including universities, State agencies, and private laboratories. Each center is to develop a three-year research plan which sets the goals and priorities for research and monitoring in the marine and coastal waters of the region.

The centers will be eligible for basic support grants of $3 million per year. The bulk of this funding, at least $2.5 million, will be used directly by participating research organizations to carry out the research and related activities identified in the three-year research plan.

I hope this hearing will help us answer some basic questions about the legislation. Is expanded research an appropriate response to the threats to coastal waters? Is the focus on regional marine ecosystems needed? Is it workable? Should we give regional research institutions the lead in this effort as proposed in the bill, or should we ask a Federal agency to step in and take the lead?

I also hope that our witnesses will help us improve the mechanics of the bill to ensure that this effort is fully coordinated with related programs, that we keep program overhead to a minimum, and that we assure that the research meets the highest scientific standards.

I look forward to working with all interested parties in developing the best possible legislation to support marine research. This is an essential first step if we are to keep pace with the growing threats to the marine environment and assure that ocean resources are protected for future generations.

We have a distinguished list of witnesses today. The first panel includes Dr. Tudor Davies, Director of the Office of Marine and Estuarine Protection of the U.S. Environmental Protection Agency; and Mr. John Carey, Deputy Administrator, National Ocean Service, National Oceanic and Atmospheric Administration.

Gentlemen, welcome. I look forward to your testimony.

I will state at the outset for your benefit and the benefit of the other witnesses the rules under which this committee operates. As you know, your full statement will be placed in the record in full. We ask that you limit your oral remarks to the points you regard as most important and that you limit them in time to five minutes.

To help you in that latter regard, there is a panel of lights immediately before me, and they mean the same thing that traffic lights mean. If it is green, keep right on going; if it is orange, think about slowing down; and if it is red, stop.

Thank you very much, and we will begin with Dr. Davies. Good afternoon, Doctor.

STATEMENT OF TUDOR DAVIES, DIRECTOR, OFFICE OF MARINE AND ESTUARINE PROTECTION, ENVIRONMENTAL PROTECTION AGENCY

Dr. DAVIES. Thank you.

Good afternoon, Senator. Thank you for inviting me.

Over the last few months, representatives of EPA have appeared before relevant House and Senate committees to testify as to the importance of our estuarine and near coastal waters and our activities in seeking to protect and restore this resource.

Our estuarine and near coastal waters are a vital resource, providing habitat for marine resources, abundant fishing grounds, and significant recreational opportunities. However, this resource receives pollutant inputs from numerous sources, is subject to stresses associated with resource exploitation, and also is subject to pressures associate with the burgeoning population growth taking place in coastal areas.

The agency recognizes that the unique features of these waters place them at a greater risk for degradation and, thus, in greater need of management attention. I will not repeat the substance of the agency's previous testimony, but I do wish to point out that we share your concerns of the state of our estuarine and near coastal waters and that we strongly support your efforts to direct the Federal Government's attention to these problems. We believe that well-focused and carefully planned marine research and monitoring plays an important role in developing effective measures to protect and restore our coastal waters.

However, the agency does not support the bill as presently drafted, because it duplicates and competes with NOAA's existing programs, and sufficient Federal coordinating mechanisms exist. However, we consider this to be a major and substantial authorization of new money and are concerned about the overlap.

We are concerned that we target and focus resources and that the Federal role is well established in this legislation. We see the Federal role as tying into existing programs and building upon them; supporting State and local activities with research, with technical assistance, with technology transfer, and coordination; and we think it is very important that any bill you introduce build upon existing structures and not duplicate them.

We recognize the importance of carefully focused and planned environmental research and monitoring in assessing environmental trends and in identifying the sources and impacts of pollution. Well conceived and executed research and monitoring are especially important when dealing with such complex and variable environments and ecosystems as our coastal waters.

In order to develop effective measures to protect our near coastal waters, it is first necessary to identify and understand the scope of the problems presented and the sources and causes of these problems. Research and monitoring efforts which are targeted on such questions thus play a vital role in formulating effective strategies to alleviate the environmental problems facing many of our near coastal waters.

As we have done in the Great Lakes and in the Chesapeake Bay, we believe in trying to manage on an ecosystem basis by looking at the multiple sources impacting the water body and linking the water body to the drainage basin from which is derived the land-based pollution.

We see, in a time of scarce resources, that a major burden for implementation of any recommendations to improve coastal waters will fall on State and local authorities. These people will require the best technical information to support their decisions.

For example, in the Great Lakes over the last 10 years, we have spent Federal dollars in municipal construction on the order of $5 billion. In that time, we have spent only a small amount for research.

In Long Island Sound, in one of our on-going estuarine program studies, an estimate has been made of $6 billion worth of new construction to mitigate some of the problems.

I would say that what we really need from you, Senator, is some very targeted research to address some of the major problems in the coastal area. We need to convince locals who have to support these activities in terms of capital costs and in terms of maintenance of treatment facilities that we have the best technical information for management decisions, and I would ask that you particularly focus your legislation on supporting management decisions.

Thank you.

Senator MITCHELL. Thank you, Dr. Davies.

Ending on the orange light establishes a commendable standard of brevity to which the rest of the witnesses can aspire.

Mr. Carey, welcome. We look forward to hearing from you as always.

STATEMENT OF JOHN CAREY, DEPUTY ASSISTANT ADMINISTRATOR, NATIONAL OCEAN SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ACCOMPANIED BY ALAN THOMAS, DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

Mr. CAREY. Thank you, Mr. Chairman.

Thank you for this opportunity to present the views of the Department of Commerce and the National Oceanic and Atmospheric Administration on S. 2068, the Marine Research Act of 1988.

Accompanying me today is Dr. Alan Thomas who is the Deputy Assistant Administrator of our Office of Oceanic and Atmospheric Research.

Mr. Chairman, I would like to begin by applauding your efforts in focusing attention on the problems facing our Nation's coastal areas. The series of hearings which you are holding, I believe, have amply demonstrated that we are facing serious problems which we need to address.

At NOAA, we are well aware of these problems, and as Dr. Evans, our new Administrator, testified before the committee last week, we are actively engaged, with the Secretary's support, in looking at how we can better focus our research, assessment, and monitoring and information dissemination programs to increase our effectiveness. We would like to work closely with you and your staff in exploring ways to attack these problems and, in particular, to strengthen the research component which is so critical to our future understanding of the processes of change that are occurring in our coastal waters.

Having said all of that, Mr. Chairman, the Administration cannot support the bill as currently drafted. It is not clear that the mechanism proposed, the establishment of regional marine research centers, is necessary to bring about the desired results.

As the bill recognizes, programs are already in place and funded under the National Sea Grant program, the Federal Water Pollution Control Act, the Fish and Wildlife Act, and the Magnuson Fisheries Conservation and Management Act. These programs not only fund regional research, but through their direct contact with State and local government officials, universities, and private research institutions, collectively represent a wealth of knowledge and understanding of regional issues and problems.

At the Federal level, NOAA, EPA, and other agencies with strong interests in coastal problems coordinate their activities through the National Ocean Pollution Policy Board. This board has a statutory mandate to coordinate marine pollution research, development, and monitoring activities funded by the Federal Government.

The existing National Ocean Pollution Policy Board already takes into account regional variations in research needs and includes representatives of diverse regions in its nationwide planning efforts.

Mr. Chairman, while the proposed regional research centers in the bill would not literally duplicate existing NOAA programs or responsibilities, they would create yet another coordination mechanism. The Administration is concerned about the additional cost to the taxpayer that would result.

We believe that a better approach within existing resources would be to strengthen the programs and authorities that are already in place to achieve the objectives stated in the bill. We think that can be done, and we would welcome the opportunity to work with you and your staff.

Dr. Thomas and I would be happy to address any questions that you might have.

Thank you, Mr. Chairman.

Senator MITCHELL. Thank you very much, Mr. Carey.

I will begin by saying to both of you that last week, representatives of your agencies, EPA and NOAA, were here and testified to this subcommittee that the marine environment faces significant problems. They then followed that with testimony which attempted to defend cuts in programs to address those problems.

The Administration proposes to cut the construction grants program, to cut the non-point pollution control program, and the status and trends program.

It is very disturbing, on the one hand, to hear people say there is a serious problem here and then to oppose any effort to do anything about it. Now, we are hearing essentially the same message.

This raises the question as to whether we can look forward to other than lip service from the Administration on dealing with what I think is a very serious problem. And I must say it is particularly disappointing, because where we have been able to work together with the Administration, we have had some good progress, and I think we could do so again in this case.

I recognize and respect the fact that you are part of an Administration, and you must, in good faith, come here and represent the Administration's views. I will say to you now that one of the constant irritants and difficulties we have had in this Administration is the extent to which the Office of Management and Budget dictates policy to all of the agencies of Government, and we have been over that numerous times. I am not going to get into that now. That is just an overall concern that we have.

I would like to ask you a few specific questions, however, some to which I will ask you to respond now and some to which you may want to make a more considered written response.

Mr. Carey, even though you oppose the bill, I liked your verbal testimony more than your written statement which was somewhat more negative, but because the written statement will go into the record, I want to ask you a question briefly on the question of duplication, because that appears to be the heart of the opposition to the bill.

I could understand it if you opposed the bill if you disagreed that a problem exists, which you don't appear, or even if you said you didn't want to spend the money, because you thought there were higher priorities. However, if you base it on duplication, I don't think that is the case.

I would like to ask you if you would provide the committee in writing a specific point by point assessment of how each provision of this bill would duplicate an existing program so that you can put substance behind your charge of duplication and we can then consider it.

I happen to disagree with you, but I will say I have a completely open and receptive approach to eliminating duplication. So, if you are able to persuade me or other members of the committee of that, I assure you that we will do everything we can to eliminate that duplication.

Mr. Carey. Yes, sir, we would be happy to do that, and I think that we share your feelings and concerns that certainly for the benefit of any program, we do need to consider if there are in fact areas of duplication, because they work against accomplishing the objectives that I believe we both share.

[The information requested follows:]

While there is not an exact one-for-one match between provisions of S. 2068 and existing programs and activities, there are substantial overlaps in terms of (1) authority to conduct or support research, and (2) regional research planning and coordination authority.

(1) Authority to conduct or support research:

Subsection 404(c) of S. 2068 authorizes regional marine research centers to "support basic and applied research, investigations, monitoring, and assessment activities . . . in the estuarine, near-shore coastal, and offshore environments of the region," and to conduct related activities including cooperating with other agencies and entities in supporting research, entering into contracts and other agreements, hiring staff and procuring equipment including research vessels, and so forth. Subsection 404(d) lists areas of investigation the centers may support.

NOAA has authority under several statutes to conduct or support basic and applied research, investigations, monitoring, and assessment activities in estuaries, near-shore coastal and offshore environments, and to perform all necessary support activities including cooperation with other entities, entry into contracts and other agreements, providing staff and equipment, and so forth. NOAA maintains and operates a fleet of 23 vessels to support its own research efforts and those of cooperating organizations.

NOAA research authorities include, among others:

The National Sea Grant College Program Act;

The Fish and Wildlife Act of 1956;

The Marine Protection, Research, and Sanctuaries Act of 1972 as amended;

The Magnuson Fishery Conservation and Management Act of 1976; and

The Act of August 6, 1947, as amended (33 U.S.C. 883a–i) which established the Coast and Geodetic Survey (now a component of NOAA) and authorized it to perform surveys, tide and current observations, and geomagnetic, seismological, gravity and geophysical measurements; to analyze data and make forecasts and predictions; to publish and disseminate data and information; to conduct developmental work in geophysical sciences including geodesy, oceanography, seismology, and geomagnetism; to enter into cooperative and other agreements and contracts; and to employ public vessels to carry out these functions.

S. 2068 would create overlaps with or duplication of programs and research activities of the National Ocean Service, the National Marine Fisheries Service, and the Office of Oceanic and Atmospheric Research, such as the National Sea Grant Program, the National Status and Trends Program, the Benthic Surveillance Program, the Fish Ecology Program, the Marine Entanglement Program, the Marine Sanctuaries Program, and the Estuarine Reserve Research System program.

(2) Regional research planning and coordination authority:

Subsection 404(b) of S. 2068 authorizes regional marine research centers to set overall, long-term regional goals for research and monitoring, to develop comprehensive long-range plans which identify needs and priorities for research and monitoring, and to provide a forum for review and comment on research plans and for coordinating research among various institutions.

As noted in NOAA's prepared testimony, the National Ocean Pollution Planning Act (NOPPA) established an interagency research, development and monitoring coordination program which takes into account regional variations in research needs, and includes representatives of diverse regions in its planning efforts.

Also, the National Sea Grant College Program is required by statute to foster development of marine and estuarine programs for research, education, and outreach. Research proposals submitted by Sea Grant institutions are composed of clusters of linked, multi-institutional, multidisciplinary research efforts.

While Sea Grant programs have an orientation to individual states where Sea Grant institutions are located, this is largely attributable to the matching funds requirement for base awards from NOAA. Still, many presently active environmental studies programs involve cooperative, regionally-oriented efforts by investigators from several Sea Grant institutions. For example, studies of nitrogen dynamics in coastal pond environments are being undertaken cooperatively by Sea Grant scientists from North Carolina, New Jersey and Rhode Island. Other cooperative efforts on regional issues are being conducted in Long Island Sound, the Chesapeake Bay, and the Gulf of Mexico.

S. 2068 recognizes the need for both "basic" and "applied" marine environmental research. Rather than indicating priorities for research on specific contaminants or specific management issues, NOAA suggests that the bill could more usefully focus on developing improved understanding of the processes that regulate marine and estuarine ecosystem functioning and on applying that information to environmental management decisions at the federal, state and local levels.

Senator MITCHELL. Dr. Davies, in your written testimony, one of the reasons you give for opposing the bill is that the Department of Justice has concerns about its constitutionality.

Dr. DAVIES. Yes, sir.

Senator MITCHELL. I would like to make clear that that is what I think is a relatively minor issue that can be clarified, and I would like to read the appropriate paragraph from the Department of Justice's letter so we understand what the issue is here. In the letter, the Department states,

> We suggest that the bill be amended so that membership on the board be limited to delegates of the designated executive agencies or other properly appointed officers of the United States and that the authorities of the State Governors and the centers be explicitly limited to making recommendations which the board would

accept or reject at its discretion. These amendments would eliminate the unconstitutional features of the bill.

Have I correctly quoted the Department of Justice's letter?

Dr. DAVIES. Yes, you have.

Senator MITCHELL. Then, my question is, if we were to make these changes as recommended by the Department, would the only remaining objection of the agency be the duplication of existing NOAA programs?

Dr. DAVIES. As I said in my oral testimony, our concern is that we target the research. The bill would authorize a major block of money that dwarfs many of the things that we do in the coastal area.

My concern would be that you add to the bill criteria for accepting or denying regional research plans in order to focus research activities on identifying and understanding problems in the coastal zone so that the information gained will be of use in managing or controlling the major issues that we face.

In dealing with things like the Chesapeake Bay, with Puget Sound, et cetera, a substantial body of technical knowledge is needed before we can convince management agencies that they need to appropriate money and go into higher levels of treatment.

Our concern would be that you add some targeting to your bill so that you would identify problems and address research to resolve those problems rather than making it perhaps general, as I feel you have at this point in time.

Senator MITCHELL. Well, that is a reasonable suggestion. Would you provide to the committee in writing the criteria that you propose be added to the bill to achieve that objective?

Dr. DAVIES. Yes, certainly.

Beyond that, I think our concerns were those of duplication that were raised by our sister agency.

Senator MITCHELL. All right, then, might I ask that you also in your written submission to the committee include your point by point assessment on duplication and, Mr. Carey, that in your submission, you also cover the point that I just asked Dr. Davies to cover, and that is to propose specific written criteria to be added to the bill to provide the additional targeting which Dr. Davies suggests would improve the bill.

Mr. CAREY. Yes, sir. We would be happy to do that.

Senator MITCHELL. All right. Thank you both very much for your testimony. We look forward to working with you on this.

Mr. CAREY. Thank you, sir.

Dr. DAVIES. Thank you.

Senator MITCHELL. I have received a letter from Senator Warner to which he has attached his statement and the statements of two constituents. His letter and the attachments will be entered into the record.

[The material referred to follows:]

John Warner

STATEMENT ON S. 2068
AMENDMENT TO THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

BY SENATOR JOHN WARNER

APRIL 28, 1988

IT IS WELL-DOCUMENTED FROM NUMEROUS MARINE ENVIRONMENTAL REPORTS ON THE COASTAL COMMUNITY THAT INCREASING COMPETITIVE DEMANDS CAUSED BY POPULATION GROWTH AND ECONOMIC DEVELOPMENT HAVE BEEN ADVERSELY IMPACTING OUR FRAGILE MARINE AND NEAR-SHORE COASTAL WATERS.

THE COAST ALLIANCE REPORTS IN AND TWO IF BY SEA THAT BY 1990, 75% OF THE COUNTRY'S POPULATION WILL LIVE WITHIN 50 MILES OF A COAST WHILE THE OFFICE OF TECHNOLOGY IN THEIR STUDY ON WASTES IN MARINE ENVIRONMENTS CONCLUDED THAT ESTUARIES AND COASTAL WATERS AROUND THE COUNTRY RECEIVE THE VAST MAJORITY OF POLLUTANTS INTRODUCED INTO THE MARINE ENVIRONMENTS.

THESE POLLUTANTS HAVE EVOLVED FROM THE MORE CONSERVATIVE TYPES THAT THE CLEAN WATER ACT AND OTHER ENVIRONMENTAL LAWS HAVE TRADITIONALLY ADDRESSED. COLLECTIVELY, TODAY ALL OF US ARE FACING POLLUTION PROBLEMS THAT STEM FROM TOXIC CHEMICALS THAT ARE DUMPED INTO GROUNDWATER SOURCES, INDUSTRIAL WASTES LIKE HEAVY METALS, MUNICIPAL SEWAGE, AND NONPOINT SOURCES LIKE AGRICULTURAL AND URBAN RUNOFF.

JOHN WARNER
VIRGINIA

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April 27, 1988

Honorable George J. Mitchell
Chairman
Subcommittee on Environmental Protection
Committee on Environment and Public Works
United States Senate

Dear Mr. Chairman:

I wish to commend you for scheduling a hearing on S.2068, the "Marine Research Act of 1988", and I am pleased to be a cosponsor of that legislation. I also appreciate your willingness to accept for the printed hearing record the testimony of two distinguished Virginians.

I enclose testimony on S.2068 prepared by those two constituents. Dr. Frank O. Perkins is Director of the Virginia Institute of Marine Science at the College of William and Mary. Mr. William L. Rickards is Director of the Virginia Graduate Marine Science Consortium at the University of Virginia. These two highly professional groups are involved in the restoration of the Chesapeake Bay.

While these two gentlemen were unable to appear before the Subcommittee to present their testimony in person, I do appreciate the Subcommittee's consideration of their comments and inclusion of these statements in the printed record of the Subcommittee's deliberations.

While I do not have the privilege of serving on the Subcommittee, I also enclose my own statement on S.2068 which I would appreciate being included in the printed Record.

Thank you for your consideration. I look forward to working with you on this legislation at full Committee.

With kind regards, I am

Sincerely,

John Warner

John Warner

JW:jam

Enclosures

I AM CONCERNED THAT THE CUMULATIVE IMPACT OF THESE POLLUTANTS, COUPLED WITH THE PROJECTIONS OF GROWTH , REQUIRES THE DESIGN AND FINANCIAL SUPPORT TO IMPROVE OUR UNDERSTANDING OF THE COMPLEX ARRAY OF PROBLEMS, SO THAT WE MAY BETTER DIRECT THE WISE MANAGEMENT OF THE MARINE ENVIRONMENT. DEVELOPING RESTORATION AND PROTECTION PROGRAMS THAT BALANCE ALL OF THE VARIED USES OF A MARINE ENVIRONMENT, REQUIRES THE NEED FOR BOTH THE ACADEMIC INSTITUTIONS AND MANAGERS TO CONDUCT RESEARCH EFFORTS THAT PRODUCE USEFUL ANSWERS.

MR. CHAIRMAN, S. 2068 REPRESENTS AN EFFORT TO INCREASE THE FUNDING FOR MARINE RESEARCH IN THE NATION. TO BE TRULY EFFECTIVE, THIS INITIATIVE MUST TAKE FULL ADVANTAGE OF THE EXISTING STRUCTURES, AND SHOULD COMPLIMENT AND ENHANCE EXISTING LAWS AND PROGRAMS.

I CONTINUE TO BE CONCERNED ABOUT THE RESTORATION OF THE CHESAPEAKE BAY. AS YOU KNOW, IN 1983, EPA COMPLETED A $27 MILLION STUDY THAT FOCUSED ON THE REASONS THAT CAUSED THE DECLINE OF THE CHESAPEAKE BAY. THAT STUDY WAS THE FIRST COMPREHENSIVE RESEARCH STUDY THAT WAS THE FIRST STEP TO RESTORE THE CHESAPEAKE BAY. THE CURRENT IMPLEMENTATION PROGRAM IS BASED ON THAT RESEARCH ON NUTRIENT ENRICHMENT, TOXIC MATERIALS, AND THE DECLINE IN VITAL SUBMERGED AQUATIC VEGETATION.

FUNDING FOR THE CHESAPEAKE BAY PROGRAM SINCE 1983 HAS PRIMARILY SUPPORTED NONPOINT SOURCE IMPLEMENTATION ACTIVITIES GEARED TO REDUCE THE AMOUNTS OF NUTRIENTS FROM AGRICULTURAL ACTIVITIES. IN DECEMBER 1987, A NEW CHESAPEAKE BAY AGREEMENT WAS SIGNED BY REPRESENTATIVES FROM VIRGINIA, MARYLAND, PENNSYLVANIA, THE DISTRICT OF COLUMBIA, THE CHESAPEAKE BAY COMMISSION AND EPA. ONE OF THE IMPORTANT COMMITMENTS IN THE NEW AGREEMENT IS TO DEVELOP AND IMPLEMENT A COORDINATED BAY-WIDE RESEARCH PROGRAM BY JULY OF 1988.

I HAVE REVIEWED THE COMMENTS DIRECTED TO S. 2068 FROM THE VIRGINIA INSTITUTE OF MARINE SCIENCE AND VIRGINIA'S SEA GRANT COLLEGE, TWO HIGHLY PROFESSIONAL GROUPS THAT ARE INVOLVED IN THE RESTORATION OF THE CHESAPEAKE BAY. I SHARE THE CONCERNS REGARDING THE DUPLICATIVE STRUCTURE THAT S.2080 COULD ESTABLISH.

I LOOK FORWARD TO WORKING WITH YOU TO IMPROVE S.2080 AND THANK YOU FOR YOUR EFFORTS IN PROTECTING THE MARINE ENVIRONMENT.

Virginia Sea Grant College Program

VIRGINIA GRADUATE MARINE SCIENCE CONSORTIUM
Madison House 170 Rugby Road University of Virginia Charlottesville, VA 22903 (804) 924-5965

April 26, 1988

Senator George J. Mitchell
United States Senate
SR-176 Russell Senate Office Building
Washington, DC 20510-1902

Dear Senator Mitchell:

I am writing in reference to your kind letter of March 18 requesting my input on S. 2068, the "Marine Research Act of 1988" which you recently introduced.

At the outset of my response to your request, I would like to acknowledge your interest and initiative in forging a piece of legislation that has the potential to substantially increase the level of research being applied to the nation's oceans and coastal waters. With the recent declines in ocean program funding within NOAA, an effort such as yours is certainly needed if this country is to remain technologically competitive with the rest of the developed world.

In addition, I would like to take this opportunity to thank you for your continued support for the National Sea Grant College Program and its recent reauthorization. Because of my affiliation with the Virginia Sea Grant College Program, I am sure that you can understand my desires to see such reauthorizing efforts and the appropriations which follow. Nevertheless, your support for ocean programs is appreciated by all of the government, academic and industrial researchers, educators and extension personnel who participate in the myriad activities encompassed by Sea Grant.

Concerning S. 2068 itself, I feel that there are several close similarities between the existing Sea Grant Program and the proposed Marine Research Centers. These similarities include the following:

a) The regional research centers would be designed to foster and coordinate research on an ecosystem basis. The network of Sea Grant programs has evolved the ability to perform these same functions on a multi-state, regional or national basis depending on the issue being addressed. Further, the regions into which the Sea Grant programs can be divided are entirely flexible, dependent upon the issue rather than artificial criteria such as state lines or loosely boundaried zoogeographical provinces, and can be reconfigured as needed to address a particular problem. For instance, the states of Texas, South Carolina, Mississippi, California and Hawaii are currently engaged in research into various aspects of marine shrimp farming while Sea Grant researchers in Rhode Island, Virginia, North Carolina, New York, New Hampshire and other states are developing an initiative which will assess the impact of nutrient pollution upon seagrass ecosystems. While these efforts are underway, it is likely that researchers from these and other states will address issues for which their expertise is particularly applicable. The point here is that the Sea Grant network is in place as an administrative unit to conduct multi-state, regional or national research efforts in a coordinated fashion.

b) The proposed Marine Research Centers would serve as a forum for scientists. The scientific community needs such interaction; I would point out that management of our coastal waters is becoming very much a public program (e.g. the Chesapeake Bay Program and its extensive public involvement) and I would suggest that there is a need for providing more exposure of the scientists to the public and vice versa so that the two begin to better understand the concerns of each other. Throughout the coastal and Great Lakes states, the Sea Grant programs have been and will continue to provide the interface between scientists with technical information and the public which needs to understand that information. Each year the Sea Grant programs conduct literally hundreds of workshops, conferences and meetings involving the interaction of scientists, agencies, industries and the public. The point being that the Sea Grant programs are in place, as a result of Congressional action, to provide just such a forum for all of the audiences involved with the issues of the times.

c) The Marine Research Centers would develop long-range plans for the research to be conducted within the identified marine ecosystems. Such plans are needed to provide direction and focus to emerging research programs. Coincidentally, the Sea Grant programs produce their individual long-range plans for these same purposes, and the entire network continues to develop forward-looking plans to give direction to future research, education and advisory efforts while also identifying emerging issues which are on the scientific horizon. In this way, the Sea Grant programs, both individually within their own states and collectively as a network, help to forge research priorities and funding strategies for their universities and the marine scientific community as a whole.

In addition, I would be remiss if I did not point out that the recently passed reauthorization for the National Sea Grant College Program contains language pertaining to the development of Strategic Research Initiatives which are to address the emerging issues of a national concern in the oceans. Thus, it would seem that a responsibility for planning and looking ahead has been given to Sea Grant by the Congress.

d) The Marine Research Centers would provide supplemental research funds to the existing institutions. Certainly, additional marine/ocean program funding is needed; on this point there is overwhelming agreement in the marine community. However, I suggest that it would be more efficient to utilize an existing administrative system to provide such funds, on a peer-reviewed and competitive basis, for research that has been identified through a planning process that has involved input from the majority of the marine scientific community. Clearly, I am indicating that the Sea Grant programs are the logical mechanism to use for this purpose rather than establishing a duplicative system of regional centers.

e) The Marine Research Centers will function with advice and input from industries and agencies in their regions. Use of such input form all of the potential user groups has always been a keystone to the Sea Grant method of operation. To institute a similar structure and ask the fishing industry, management agencies, or other user groups to participate on advisory boards will only serve to muddle the picture, create confusion among the user groups as to who is supposed to conduct which programs, and pit the in-place Sea Grant process against a newly created mechanism which is trying to do many of the same things as Sea Grant. Needless to say, the opportunity for critics to shoot at both organizations would then be very great.

f) My final point concerns a very real problem which will likely emerge should the Marine Research Centers take shape as set forth in S. 2068. Since its beginning in 1966, the National Sea Grant College Program has strived to provide recognizable focal points of responsible administrative leadership in marine research, education and advisory services within each coastal and Great Lakes state. Creation of the regional marine research centers as in S. 2068 would lead to considerable in-fighting and maneuvering among the existing marine research institutions (not the Sea Grant programs) in each region until one emerged as the leader. This action would undermine years of cooperative interaction which the various Sea Grant programs have established. We currently have a truly interactive national network which involves some 270 college and universities; there is no marine research, educations or advisory service entity in a coastal or Great Lakes state that is without the opportunity to submit proposals for funding to a Sea Grant program.

I strongly endorse your efforts to increase the funding for marine research in the nation. I propose, however, that an efficient and effective mechanism exists for making use of such funds without creating a new and duplicative administrative structure, and that mechanism is the National Sea Grant College Program.

Speaking for myself, but with confidence that the Directors of the other 29 Sea Grant programs in the country would agree, the Sea Grant network stands ready to assist you in expanding the nation's marine research, education and advisory efforts. We would hope that this can occur through expansion of the existing Sea Grant programs which were recently reauthorized by Congress.

Again, thank you for the opportunity to provide my thoughts concerning S. 2068. If you desire further explanation of any of the points made above, please do not hesitate to contact me.

Sincerely yours,

William L. Rickards
Director

WLR/let

CC: [redacted]
Senator Paul Trible

VIMS
THE COLLEGE OF WILLIAM AND MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

April 26, 1988

The Honorable George J. Mitchell
United States Senate
Washington, D.C. 20510

SUBJECT: Senate Bill 2068 - Marine Research Act of 1988

Dear Senator Mitchell:

Thank you for the opportunity to comment on the important initiative you and your co-sponsors have taken in the Marine Research Act of 1988 (S. 2068). Focusing the program on regional ecosystems is very sensible. I also agree that greater inter- and intra-regional coordination is needed. And without surprise to you, I am sure, I certainly agree that enhanced funding is required if we are to successfully cope with the growing threat to our coastal waters. Thus, in the broad concept we support the proposed regional centers and applaud your initiative.

As you mentioned in your letter of 18 March, it is of the utmost importance that we gain a comprehensive understanding of marine ecosystems and their responses to impacts. This embodies a commitment to long-term, focused basic research efforts. This need is particularly acute in estuarine and coastal marine science. At the present time only a small proportion of the basic marine science research funds are devoted to coastal environmental issues; thus, your initiative could bring a much needed focus to coastal waters. The results derived from that focus will benefit the international community as well.

It is in connection with the need for basic research that I offer comment regarding the implementation and administration of the proposed center program. The Bill proposes a complementary program of basic and applied research and monitoring administered by the Environmental Protection Agency, a regulatory agency. It is my observation that basic science programs do not flourish under such circumstances. Short-term, applied research activities and monitoring receive most of the emphasis. This is quite understandable since they must manage and regulate now. I think the proposed arrangement would suffer from such a drawback. We favor a framework wherein either the National Science Foundation (NSF) or the National Research Council (NRC) of the National Academies of Science and Engineering provide the oversight to the program. That oversight would provide stronger assurance that a proper balance between applied and basic research was maintained. Intrinsic to a strong program in basic research is a well formulated peer system to review proposals and evaluate results. Both the NSF and NRC have this tradition for the basic sciences which could

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be broadened to include the applied research and monitoring plans. The Marine Research Coordination Board would still play the central role in coordination of the regional centers under the suggested oversight.

In addition to the above substantial suggestion, we respectfully submit the following points concerning some details:

a. Upon reviewing the agencies to be included on the Board membership, we note the absence of the United States Geological Survey. That agency has considerable activity in estuarine and coastal research.

b. The proposal requires each regional center to form a Research Advisory Group with representation from affected user and interest groups. Such advisory boards have proven very useful for open communications. However, in our experience such groups do not provide a framework for guidance of the actual research. To that end we suggest a Scientific and Technical Advisory Group composed of peers from the community of scientists. Their charge would be ongoing peer review of the work performed at the Center. Perhaps membership should include scientists from adjacent centers. Such an arrangement would ensure active communication, at the working level, between contiguous centers.

I hope these comments are useful to you. The potential value of the proposed Marine Research Act is enormous. Please call upon me if we can be of service as you advance this important legislation.

Sincerely,

Frank O. Perkins

Frank O. Perkins
Dean/Director

FP:cl

cc: Senator Warner

Senator MITCHELL. The next panel includes Kenneth Curtis, the President of the Maine Maritime Academy and representing the Association for Research on the Gulf of Maine; Mr. Ronald Dearborn, Director of the Alaska Sea Grant Program and Chairman of the National Sea Grant Association; Ms. Robin Alden, publisher of Commercial Fisheries News; and Mr. Charles Fox, Director of the Coastal Protection Program of the Environmental Policy Institute.

Ms. Alden and gentlemen, welcome. We look forward to hearing from you.

I want to state for the benefit of the record and the public that I am pleased and delighted that Governor Curtis has been able to join us. He is a very distinguished former Governor of Maine, former Ambassador to Canada, someone who has had a long association with coastal resources, one of the great public servants of the modern era in Maine, and, I am pleased to say, a particularly close personal friend for many, many years.

Governor, we welcome you, and we look forward to hearing from you.

STATEMENT OF KENNETH CURTIS, PRESIDENT, MAINE MARITIME ACADEMY, REPRESENTING THE ASSOCIATION FOR RESEARCH ON THE GULF OF MAINE

Mr. CURTIS. Thank you very much, Mr. Chairman.

I could go on for more than five minutes about my admiration for you and the job you are doing——

Senator MITCHELL. We won't count that against you.

Mr. CURTIS. Senator, the people of Maine, as you know, appreciate the fragility of its rich natural resources and take great pride in the fact that their State is a leader in strong environmental legislation. So, it is no surprise that we in Maine are extremely proud of the job that you are doing to so effectively continue that commitment.

In spite of all that has been accomplished since the 1960's, Maine people are fearful of the stress that the present rate of growth is placing on our coastal waters and beyond. Although much of my testimony concerns the Gulf of Maine, we also recognize that it is not a problem which is unique to Maine.

The coastal waters on our Atlantic, Pacific, and Gulf coasts have for centuries been of immense value to this country. No one would disagree that wise management and conservation measures are a necessity if these waters are to retain their value for future generations.

It is unfortunate that in all too many instances, the quality of scientific information runs far behind the pressures that are being placed upon these waters. At the moment, the majority of our coastal seas are basically healthy, but without foresight and appropriate measures, their quality will deteriorate, and the cost of restoration, if scientifically possible, will be staggering.

There are already warning signs in the Gulf of Maine. In testimony before this subcommittee on September 8, 1987, one of Maine's leading scientists, Dr. Charlie Yentch, warned, "The signs are all out there—sea level rise, population growth along the coast, red tide outbreaks, drastic changes in fish abundance, toxic metals, acid rain, acid fogs, and so forth."

So, as once isolated problems are beginning to attract public attention, our present scientific knowledge of the Gulf of Maine is woefully inadequate to wisely manage this resource. Much of our current research activities seem to be directed toward specific problems with less broadly defined objections. While these efforts need to continue, they contribute little toward the understanding of the total ecosystem.

The need, therefore, for coordinated research plans which have been carefully thought through and effected at the local level argues for the concept of independent regional research centers. No mechanism presently exists that has the capability to coordinate Federal research activities with those of State organizations and private institutions.

A system of independent research centers is the only realistic vehicle to develop an overall long-range coordinated research plan. Without sounding overly critical, my experience in government tells me that the nature of existing governmental and private entities is one of being under-funded and over-taxed by scientific and administrative demands, leaving precious few resources to apply to long-range coordinated planning.

As has been stated earlier and as you know well yourself, Senator, the clearest danger any new governmentally sponsored organization can have is top-heavy administrations and potential duplication of existing programs. However, the Marine Research Act of 1988 has been created to address exactly those concerns where only one-sixth of the $3 million proposed may be spent on administration and five-sixths must go for research and monitoring. Indeed, that would be refreshing if this could be carried throughout all Federal agencies.

This bill also recognizes that coastal estuaries with their related ecosystems differ from region to region. It also recognizes that local input is essential. State government, State legislatures, and local public support must be added to Federal initiatives if we are to be successful.

The Marine Research Act also would support and coordinate basic and applied research. A good example of coordination of such an agency, I think, is the Great Lakes Water Quality Agreement which has been extended twice since its conception.

This agreement created a small office under the United States-Canadian Joint Commission to coordinate State, Federal, and Canadian efforts in the massive effort to clean up the Great Lakes.

So, I applaud you, Senator, for your efforts, and we in Maine certainly hope you will be successful, not for us but for future generations.

Senator MITCHELL. Thank you very much, Governor Curtis.

Mr. Dearborn, welcome. We look forward to hearing from you.

STATEMENT OF RONALD K. DEARBORN, DIRECTOR, ALASKA SEA GRANT PROGRAM AND CHAIRMAN, NATIONAL SEA GRANT ASSOCIATION

Mr. DEARBORN. Thank you very much, Mr. Chairman.

Over the past couple of years, great progress has been made by the marine science academic community in providing a global context for ocean sciences, global in a geographic sense but, more importantly, global in the sense of unifying sciences to address broad issues of national and international interest.

Within this broad context, though, inadequate funding is being provided for coastal ocean research. It is the coastal ocean that most directly affects man and is most directly by man in terms of fisheries, recreational opportunity, and runoff. The needs for coastal ocean research funding outlined in your bill are right on target.

With respect to a regional approach for planning and undertaking coastal environmental research, again, this bill makes good sense. Multi-disciplinary concepts in ocean science and the tools of science, including remote sensing technology and deep submersible vehicles, are now available for undertaking research on a biogeographic region, and what is needed is the funding and the mandate. This bill would provide both.

Working on a biogeographic regional basis enlarges the context of research to a systems level. It places a priority on understanding the workings of the natural system, including man, who is part of the coastal ocean system and not just monitoring separate events.

Clearly, the health of the systems is affected by the accumulation of regional activity.

Planning and undertaking research on a regional level does provide its challenges. Political priorities may differ from State to State. Agencies may have different goals, and there is a diversity of scientific opinion.

Meeting these issues head on, however, is important. Planning will play a critical role in determining the success of this bill on a region by region basis. Once there is a clarity of issues and those issues are articulated in a plan, there is the basis for selecting proposals which will be submitted for funding under this bill.

We do believe that the bill overlooks a valuable partner, Sea Grant. Sea Grant has become the coastal ocean program of the nation. It has experience in planning and focusing research to meet identified needs, in networking government and academia in meeting mutual goals, and in developing and distributing to identified users credible reports.

No one is doing an adequate job in regional science planning, but even without the mandate, Sea Grant is doing a better job than most on a region by region basis in pulling together the diverse agency and industry groups. In Maine, examples of Sea Grant participation would be; the Fishermen's Forum, the Lobster Institute, ARGO Maine, and the National Undersea Research Program in the Gulf of Maine.

The largest pool of marine science talent in this nation is at our universities. We need a mechanism for that talent to join with the private laboratories and government scientists in addressing the issues identified in this bill.

Sea Grant, without the mandate, has effectively bridged those agency talent pools. With the mandate and funding, Sea Grant would be effective and efficient in undertaking that task.

With respect to administration of the program, we suggest the following:

At the regional level, we need a broad representative body to participate in the planning process and to provide regional oversight for the program.

Separate from that body but responsive to its oversight, we need an administrative unit which will select quality proposals responsive to the regional plan.

Unlike an academic department, unlike a private laboratory, unlike a government agency, Sea Grant does not have its own scientific staff and, therefore, could undertake this on a neutral basis. In its own strategic planning for coastal ocean research, Sea Grant has identified issues compatible with this bill.

Senator, we thank you for your leadership in developing the bill. We thank you for your past support of the Sea Grant program, and we look forward to joining you in a partnership in meeting the issues identified in this bill.

Thank you, Mr. Chairman.

Senator **MITCHELL**. Thank you very much, Mr. Dearborn.

I am pleased to welcome Ms. Robin Alden who is the publisher of Commercial Fisheries News and has the good fortune to live in Maine. She has been very active in fisheries matters for many years, a source of wise advice and counsel to myself and many other public officials.

Welcome, Ms. Alden. We look forward to hearing from you.

STATEMENT OF ROBIN ALDEN, PUBLISHER, COMMERCIAL FISHERIES NEWS

Ms. **ALDEN**. Thank you, Senator Mitchell. It is a pleasure to be here, especially to have a chance to speak to a bill such as this one which I feel shows real vision in identifying the types of focused marine research programs that we need right now.

I thought that perhaps the most useful thing I could do today is try to give you, first, a sense from the commercial fishing and aquaculture public about the importance of marine research at the most basic level. These people are the people who are really on the front line of the ocean observers. They are out there very day. They are more attuned to the subtleties of change in the ocean than almost anybody else, because they know it day in and day out.

My written testimony which has been entered into the record lists a number of the threats which fishermen now feel they are seeing, and I think some of these biological changes which Governor Curtis mentioned in his testimony are as good an indication as any—the algae blooms in New York in Peconic Bay, the red tide blooms we are seeing, some new toxins which are showing up—that kind of thing suggests that there is a stress in these coastal ocean systems that needs addressing.

As far as this research program, to me, what is particularly useful about it are two points: first, its regional nature and the fact that it recognizes the importance of multi-disciplinary approaches to any of these studies and, second, the basic regional planning process.

My feeling is that the process of developing a regional plan, as proposed by this bill, is what will make this non-duplicative. This, combined with the biogeographic regional approach, means that you are going to have people who, first of all, know the environment we are talking about and are involved in the study of this region, looking at it as a whole. You have thereby the most knowledgeable people possible involved in setting up a research plan.

I think it is important to mention that the experience that the research group of the Gulf of Maine has had in the last couple of years has said that there really is no way to funnel in the existing funding programs for a targeted regional ecosystem approach to something such as the Gulf of Maine, and I am sure the same problems would exist for the other regions of the country.

I am pleased to see that there is an advisory panel involved in the bill, because I feel that automatically you end up with additional knowledge—non-scientific but anecdotal and useful observations are given away to go into the process.

My written testimony states my reservations about how substantially useful this can be in the long run. It is something that I think can be an important element, but I don't want to overstate it.

Finally, I want to say that the coordination which we all seek these days, as we have very little money to spend on anything in the Federal Government, is something that has to be done right when it comes to research. I am very wary of centrally directed research. I am very much in favor of research which ends up being focused through the process of scientific exchange.

To me, what is good about this bill is that you set up a structure where you force a group which is interested in one particular body of water to pound out a research agenda, and that, to me, is very good.

A companion thought with that is that my feeling is that the national oversight should be reasonably minimal so that this priority setting at the regional level can be basically where it stands.

Finally, I just want to say in closing that this marine research issue is a global issue. It concerns all of us and our quality of life on earth, and I commend you for introducing the bill.

Thank you.

Senator MITCHELL. Thank you, Ms. Alden.

Mr. Fox, welcome, and we look forward to hearing from you.

STATEMENT OF CHARLES FOX, DIRECTOR, COASTAL PROTECTION PROGRAM, ENVIRONMENTAL POLICY INSTITUTE

Mr. FOX. Thank you, Mr. Chairman.

My statement today is made on behalf of the American Oceans Campaign, Chesapeake Bay Foundation, Clean Water Action, Coalition for the Bight, Connecticut Fund for the Environment, Conservation Law Foundation of New England, Committee to Preserve Assateague Island, Environmental Policy Institute, Friends of the Earth, Group for the South Fork, Izaak Walton League of Aemrica, National Audubon Society, National Wildlife Federation, Natural Resoruces Defense Council, North Carolina Coastal Federation, Puget Sound Alliance, Save the Bay, Westport River Watershed Alliance.

It is not overstating the case to say that our Nation is facing a coastal crisis. And the dead dolphins and medical waste which washed up on the New Jersey shore last summer are, in many respects, merely symbolic indicators of this problem. More fundamental issues such as the pervasive loss of oxygen in coastal waters from nutrient pollution, or toxic contamination of coastal waters and sediments, or the loss of critical coastal habitat go more to the heart of our nation's problems.

The causes of this crisis are as broad as the problems themselves. They range from agricultural practices which destroy wetlands and discharge nutrients, sediments, and pesticides to more traditional issues such as industrial outfalls and coastal development.

Answers and action plans to address these problems must be forthcoming.

It is this context why the proposed legislation is so important. The legislation seeks, for the first time, to get more specific answers on the nature and extent of the range of threats to our coastal ecosystems. The legislation does not put forth a comprehensive action strategy to address these problems. In fact, to the average coastal citizen, it may seem like a lot of bureaucratic mush. As we have heard today, the debate centers around terms like "informational needs," "management needs," and "data synthesis." The citizen may rightly ask, what does this have to do with the sewage treatment plant or industrial outfall down the road which spews out pollution?

The answer is a lot. Although it is not real flashy, this legislation seeks to address the fundamental nuts and bolts of coastal ecosystem management. It seeks to establish a process involving key decision makers to provide more specific answers on a range of issues.

In the final analysis, it is just such specific answers which must be used when arguing for coastal protection before a State legislature, a Governor, the Appropriations Committees in Congress, or even Federal and State courts.

A key strength of the legislation is its regional ecosystem approach to research and monitoring and the fact that it will involve Federal and State regulatory agencies in the process.

The "success story" of Chesapeake Bay, for example, was partially a result of just such an approach. Out of years of study which directly involved Federal and State agencies, consensus was finally reached on the major threats to the bay. With mutual agreement on the problems, political leadership could take over, and on the Chesapeake, this was done largely by Governor Harry Hughes of Maryland.

Having stressed the importance of this legislation, I would like to briefly discuss some ways in which it might be strengthened.

First and foremost, we believe that the authorized funding levels must be increased substantially. Coastal monitoring needs on a range of water quality and living resource parameters are truly immense. Monitoring needs alone would likely exceed the $3 million sum allotted to each region.

Also, a long-range secure source of funds must be established. The unfortunate funding history of the new Clean Water Act programs underscores this important point. It would be completely unacceptable if this program were to siphon funds from other important coastal programs.

Second, we believe that the legislation would benefit from a sharper mandate to the regional centers that their research and monitoring programs are to support priority management needs. In this regard, we would ask that the legislation specifically require the development of comprehensive monitoring programs.

In addition, the information synthesis and communication roles of the regional centers should also be enhanced. In this way, the regional centers can assume a more active role in shaping the necessary action strategies.

Finally, the legislation should clarify its relationship to existing regional efforts such as those in Chesapeake Bay, Puget Sound, and San Francisco Bay. Despite their higher profiles, these regions have pressing needs as well.

In closing, I should mention that the ultimate success of this program will be dependent upon the active involvement and support of the often disparate Federal and State agencies and citizen groups throughout the country. Substantial leadership on the part of this subcommittee and other Members of Congress will be required to meet this challenge.

Given the pressing national needs, it is our hope that this will occur in a timely fashion.

Thank you.

Senator MITCHELL. Thank you very much, Mr. Fox.

We will now proceed to the questioning of this panel.

We are pleased to have been joined by Senator Chafee who is the distinguished former chairman of this subcommittee for the previous six years and who has demonstrated great leadership in the area of protection of our coastal resources.

Mr. Dearborn, I thank you for your testimony. It is very constructive.

As you know, I am a strong supporter of the Sea Grant program, and I want to do whatever is necessary to assure that the Sea Grant program has a clear and significant role in the regional initiative proposed in this legislation.

Now, you make a good case for drawing on the experience and capability of Sea Grant institutions. What I want to ask you is a question of clarification.

Are you recommending that we retain the regional centers made up of research institutions from the region and make better use of the administrative and management resources of Sea Grant, or are you recommending that we simply ask Sea Grant universities in the region to get together and develop a regional plan and manage the funds for regional research projects with some input from other parties?

Mr. DEARBORN. Senator, thank you for your support. We recognize that.

We believe that, indeed, there is a need for a stronger regional mechanism. Call it a center without walls, if you wish, but, yes, a strong, regionally-based oversight committee drawing broadly on scientists and others in the region is badly needed, and we would suggest that Sea Grant join in that mechanism and help administer the program under that mechanism.

Senator MITCHELL. Thank you very much. That is very helpful.

I would like to ask Governor Curtis and perhaps the others to comment briefly—you heard my exchange with Dr. Davies who suggested that the bill ought to be specific in the sense that it ought to include criteria for targeting research. That raises the question of where the controls should lie, at the Federal or the regional level.

As written, the bill provides regional centers with a great deal of freedom but includes the requirement that research plans be approved by the national oversight board. Could you comment briefly, each of you, on whether you think that is the right balance. Do you agree with Dr. Davies that there ought to be perhaps more specific criteria at the Federal level, or do you think this provides too much authority at the Federal level and should be more at the State or regional level?

Governor?

Mr. **CURTIS**. A quick consideration, to me, is that it is a proper, necessary, and a pragmatic mix, because the Federal Government, as we all know, is not an island in and of itself. It must have the support locally, not only to make sure that it is reflecting the needs of each region, but it also needs local support if it is to achieve the funding that is necessary from the Federal side as well.

The States are doing a great deal today on their own. As you know, the State of Maine has taken over a UNOLS vessel. We are doing some work for URI, Senator, and we are operating it on our own without any Federal support, and a great deal of State agencies all across the United States are doing a great deal.

However, I think a national review is proper, and I think it is necessary, because the Federal Government will still be a major factor in funding. So, I think that to assure the type of coordinated planning and research that is necessary, the Federal Government has to take the role, if it is going to do the major portion of the funding, to ensure that there isn't duplication among the State and Federal agencies.

However, I think an awful lot of the leadership should come from the regional level.

Senator **MITCHELL**. Thank you.

Mr. Dearborn?

Mr. **DEARBORN**. Senator, knowledge comes in small bites and pieces. I think that using a regional panel to identify clearly and to agree upon and to articulate the important issues in that region is the first and necessary step. Then, you must wait for the scientific community to propose through its innovation and through its knowledge a response to meet those issues.

So, establishing a tight set of criteria, I think, would discourage the innovative process of science and thinking of what is the best way to get at these issues. I would encourage a clarity of issues at the regional level with Federal oversight but that the mechanism be left in place to be responsive to new and innovative ideas out of the scientific community.

Senator **MITCHELL**. Thank you.

Ms. Alden?

Ms. **ALDEN**. I really think Ron said it about as well as I could. I will just leave it at that.

Senator **MITCHELL**. All right. Thank you.

Mr. Fox?

Mr. Fox. I think I might be alone on this one. I would tend to disagree with Mr. Dearborn and probably support Dr. Davies on the need for criteria. In many ways, we do know what some of the fundamental issues are such as toxic contamination, nutrient enrichment, habitat loss, and I think there very much should be some guidance in terms of the types of issues these regional centers are to address.

I think in terms of the flexibility, obviously, that is important, but I think you have structured that in the legislation already, and there is an appropriate balance there. Issues on the West Coast, for example, of fresh water inflow into San Francisco Bay obviously would get focus out there, and that wouldn't be a focus on New York where they have combined sewer overflow problems.

So, I think the balance is in the legislation and would tend to agree with Dr. Davies that we could focus it a little bit more with criteria, because we pretty much know what some of these issues are.

Senator MITCHELL. Thank you, all of you. The record will remain open to permit any member of the subcommittee to submit questions in writing.

Senator MITCHELL. Senator Chafee?

Senator CHAFEE. Thank you, Mr. Chairman.

I just wanted to say what a pleasure it is to see Ken Curtis here. I had the privilege of serving with him when we were both Governors and we, of course, saw a lot of each other as fellow New England Governors through the New England Governors' meetings, and I had the highest respect for him then and still do.

I congratulate him. Since then, he has gone on to duties representing our country in affairs with Canada, and he is now in the academic world.

I want to say that I know the territory you are dealing with, Governor, and you mentioned in your opening remarks that the State of Maine had been well served by Governor and then, of course, Senator Muskie, and you noted the leadership that Senator Mitchell was giving in the environmental effort.

I just want to back that up. There is nobody in this Congress who is more active in environmental matters than Senator Mitchell. He has taken a lead in every area of the environment, whether it is international, ozone layer, greenhouse effect, or whether it is trying to determine what the effect of pollution is and what we can do to better the waters of the Gulf of Maine.

So, Maine is well represented in the United States Senate.

And I have enjoyed my experiences which extend from Tenants Harbor to Cutler, Maine and mostly cruising. We have been in by the Maritime Academy many times and seen your vessel there, and I want to congratulate you for the leadership you are giving to the academy, and I am confident it is in good hands.

Mr. CURTIS. Senator, I just have to take an opportunity to thank you for those kind remarks which are really not deserved. However, I do remember the bipartisan way in which you and our good mutual friend, Frank Sargent, participated, I think, in advocating environmental interests for the New England States, again, before it became in vogue in this country.

And I want to say that any time you are up our way, I hope you won't sail by. I hope you will stop in.

Senator **Chafee**. Well, when next we are in Castine, I will come by and say hello.

Mr. **Curtis**. Thank you.

Senator **Chafee**. Thank you.

Senator **Mitchell**. Ken Curtis and I share many objectives, Senator Chafee, one of which is some day to be able to afford a summer home up in that area.

If we don't buy one quickly, we are not going to be able to do so.

Senator **Chafee**. I do want to say this. Obviously, one of the problems that is constantly coming up—and I think in your testimony, Governor, you mentioned the build-up along the coast. From my experience, the Maine coastal resources group or whatever the group is that mandates no building within so many feet of the shore is very, very active up there. It hasn't ever affected me personally, because we are a little back from the shore, but I have seen neighbors who were thinking about building near the shore.

Whatever the government entity is—and I must say I am not sure of the name of it—they are right there to make sure that the home must be set back and, of course, that the sewage treatment system, whatever it might be, must be well back.

So, somebody thoughtful in Maine is looking after the overcrowding along the shores and seeing that there isn't further pollution into the Maine waters.

Senator **Mitchell**. Programs instituted during Governor Curtis' term in office.

Senator **Chafee**. Well, three cheers. I will never forget when I was Secretary of the Navy and Admiral Zumwalt came back from a trip to the Western Pacific, and he said, you know, it is the darndest thing. I went out there, and some of these orders we issue here are being carried out out there.

I want to report to you from the field that the bureaucracy that you set up—and I use that word in its very finest sense—is effective and is producing results.

Mr. **Curtis**. The problem we have now in Maine is not the quality of the laws but the rapidity in which people are coming and developers are coming. The little towns are overwhelmed with a lack of resources to respond to the tremendous growth rate that is taking place.

Senator **Chafee**. Well, when I see some developer has acquired a tremendous acreage up near Cutler—I always thought when you were there, you looked over the precipice of the earth and you were at land's end, but apparently some people think money can be made by development up in that area.

Senator **Mitchell**. Let's make sure that the reporters get it straight that it was Chafee who said that and not me.

Thank you very much, ladies and gentlemen, for your testimony.

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator **Chafee**. I have a statement that I will put in the record, without objection.

Senator MITCHELL. So ordered.

[The statement referred to follows:]

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Mr. Chairman, at the outset let me thank you for your leadership of this subcommittee, especially in the area of protecting our oceans from the devastating effects of pollution. Last week we heard compelling testimony from a number of expert witnesses, all attesting to the general decline in the health of our oceans and estuaries.

Today we will hear testimony on legislation which is designed to take the first step in halting this decline in health. The Marine Research Act of 1988, introduced by Senator Mitchell, myself, and others on this committee (Warner, Moynihan, Mikulski, Lautenberg, Graham) will expand and strengthen the research of our marine environment.

Policy makers at the state and local levels must have an adequate amount of reliable data in order to make informed decisions regarding protection of the marine environment. At present this data is lacking. The Office of Technology Assessment, in its report on wastes in marine environments, concluded:

"Monitoring, research and enforcement are currently inadequate . . . information gaps still constrain analyses of marine wastes disposal, partly because of a lack of information gathering in some areas of the country, lack of systematic analyses of gathered data, and ineffective dissemination of results."

The Marine Research Act will take a giant step toward insuring that the necessary data is produced, and used in the formulation of long term strategies for protecting marine ecosystems. An important aspect of this legislation is that it emphasizes regional, rather than just state, concerns. Unfortunately pollution does not respect state borders, especially marine pollution. The ten region-wide research centers created by this legislation would be able to determine the most effective methods of dealing with pollution on a geographical basis. Instead of focusing just on Narragansett Bay, these research centers would coordinate research on an ocean area extending from Cape Cod to New Jersey.

We have a distinguished panel of witnesses who have agreed to testify on this legislation, and I look forward to an informative and productive hearing.

Senator MITCHELL. The next panel includes Dr. James Kennett, Director of the Marine Sciences Institute of the University of California at Santa Barbara; Dr. John Farrington, the Michael P. Walsh Professor of Environmental Science at the University of Massachusetts at Boston; and Dr. Robert Duce, Dean and Vice Provost for Marine Affairs, School of Oceanography at the University of Rhode Island.

Gentlemen, welcome. I want to apologize in advance. I have to step out for a few minutes. Senator Chafee will continue the hearing.

Senator CHAFEE [presiding]. Thank you, Mr. Chairman. While you are here, Mr. Chairman, I do want you to know that we in Rhode Island are very proud of Dr. Duce. He has provided enormous contributions to oceanographic studies in our State.

He has a Ph.D. from MIT and has been chairperson of the American Association for the Advancement of Science. Currently, he is Dean of the Graduate School of Oceanography and Vice Provost for Marine Affairs at the University of Rhode Island.

So, we are very glad to have him here.

And Dr. Farrington received his Ph.D. at URI in chemical oceanography. This is a Rhode Island rally we have here.

Now, I am not sure what credentials we can give you, Dr. Kennett.

Mr. KENNETT. Can I suggest something? I was 17 years at the Graduate School of Oceanography also.

Senator **Chafee**. I thought this looked like an extraordinarily good panel.

Why don't you proceed as called up. Dr. Kennett, we will begin with you.

STATEMENT OF JAMES P. KENNETT, DIRECTOR, MARINE SCIENCES INSTITUTE, UNIVERSITY OF CALIFORNIA AT SANTA BARBARA

Dr. **Kennett**. Yes, Senator Chafee.

I am pleased to appear before this subcommittee on this important issue, and I congratulate Senator Mitchell and yourself and other cosponsors on this legislation. I believe it is timely and contains considerable foresight in addressing the issues of protecting the nation's marine coastal environments.

I believe the bill is well written, and I strongly support it. I do, however, have some suggestions for strengthening it.

My written testimony contains most of these main points, and I will briefly summarize a few of them.

Senator **Chafee**. Yes, I think if you can hit the ones that you are most concerned about.

Mr. **Kennett**. Yes, I will do that.

There is a strong need to establish regional centers in university-type settings to study environmental problems of the marine coastal regimes. Why is this? This program will provide the first opportunity to conduct broad, multi-disciplinary studies of the coastal environmental systems and ecosystems.

This is needed to better understand and respond to the developing host of marine environmental and marine resource problems and issues. This is something that we are well aware of daily in the Santa Barbara Channel region and, of course, in the greater Southern California Bight.

Experience has taught us and it teaches us daily that for almost every environmental marine resource issue and problem that confronts us, there is a requirement for a strong dose of basic research, in other words, an understanding of the systems and the processes and the interrelations in the marine system.

There is also a need to strengthen in this nation in coastal research those linkages between basic and applied research. I believe the present funding mechanisms lead to a more fragmented, less integrated approach towards the study of the coastal marine environments and their associated biota. As you well know, ocean systems are integrated systems and need to be studied as such.

I would like to suggest that you consider calling this program the Decade of the Coastal Ocean Needed because of the decay of the coastal ocean.

I have some suggestions for strengthening this program.

Each center should have considerable freedom of latitude in the research carried out. It needs to be a long-range but flexible program to respond to developing needs as they come along.

Each center should establish research priorities within a peer review system. That is very important. I believe a strong peer review system, as used, for instance, by the National Science Foundation, needs to be used within this program to maintain quality and productivity. I would suggest that you should expect top quality science to come out of this program.

I suggest that you add an educational component. Many of the existing educational systems do not, in fact, train students in a multi-disciplinary framework in studies of the coastal regime. We have a need to train experts for studies of the coastal regime for the future. I believe this is important.

I also suggest that you add a marine policy component to the bill. Effective and sensible policy responses require good communication between scientists and policy makers.

Insist on a minimum of bureaucracy. The majority of the funds should reach the researchers. This is crucial.

Keep the organizational structure simple.

Now, my perception in talking to a number of colleagues is that there is considerable agreement about the need, the direction, and the nature of this program, but it has to work properly within the general concept as defined within the bill. This is really very important.

This is a brand new approach for studying the coastal ocean. No agency in general has run such a program in the past. So, this is a fresh approach, and I would strongly suggest that it be kept fresh.

I would suggest that it not be linked with existing programs that, in fact, have a strong tradition in running research activities in certain established ways. Different approaches are needed in science. Programs such as Sea Grant are important and must be continued and, in fact, strengthened if possible. These days, scientific research needs both an integrated group effort approach as well as the more individualistic approach.

If the Environmental Protection Agency is to be the lead agency, this new program should be kept separate from conventional environmental monitoring programs. Such programs are not appropriate for university-type settings. The program should be driven by scientific needs, not by the presence of any existing administrative structure, in my opinion.

If all of these factors are in fact taken into consideration in a positive sense, then the Environmental Protection Agency would be an appropriate agency for funneling these funds to the research centers.

Finally, I have a fiscal observation. This legislation will, of course, request new funds. In spite of this, the program, if developed properly, should actually ultimately decrease the spending of considerable public funds for certain types of environmental studies that, in my opinion, have not been very effective in the past.

So, congratulations on a thoughtful bill, and I stand ready to help in any way in the future.

Senator CHAFEE. I notice there is a vote on. I am going to go over to vote and will be back quickly to continue the hearing. So, we will have a recess.

[Recess taken.]

Senator CHAFEE. Our next witness is Dr. John Farrington.

STATEMENT OF JOHN FARRINGTON, MICHAEL P. WALSH PROFESSOR, ENVIRONMENTAL SCIENCE PROGRAM, UNIVERSITY OF MASSACHUSETTS AT BOSTON

Mr. **Farrington**. Thank you very much, Senator.

Perhaps I could save us some time by saying that I support very strongly the statement of my colleague, Dr. Kennett, and pick up where he left off in the sense of expressing a few concerns about the legislation as it is now written and some suggestions in terms of modifications that might go some distance towards——

Senator **Chafee**. I think that is the best thing, because there is no point in our all being cheerleaders here for the legislation. We are all for it, but let's see how we can improve it or what suggestions you might have. Go to it.

Mr. **Farrington**. I have a concern with the lead agency being EPA. Although I have a great deal of respect for the scientists who conduct research at EPA, I am concerned that some of the programs that are on-going now are dealing primarily with management and regulatory issues.

These are very important parts of coastal and estuarine environmental quality concerns, but I think it is fair to say—and some of my colleagues agree with me—that many of the programs dealing with management and regulatory concerns masquerade as research. So, I am concerned that if this program is undertaken that we truly and really deal with research and not with management and regulatory issues.

In this regard, the mechanism that is set up, I think, runs a significant risk of being too strongly captive to local and regional political machinations and that the funds could be siphoned off with very little problem and with some imagination by State agency officials to make up for shortfalls in their funding.

By this, I don't mean that they shouldn't have adequate State management and regulatory programs. My concern is that the present mechanism may allow this to happen.

Cutting to the heart of the issue, I would endorse the previous testimony that argues for the highest quality research program and for the minimum of the expenditure of funds for overhead and management. I think this can be accomplished with a slight modification of the legislation.

First, we would have a regional research board which would be made up of representatives from the Sea Grant institutions in the area, an equal number of representatives from the academic and non-profit institution community external to Sea Grant. Here I want to state explicitly that there are many highly qualified research scientists who are concerned about environmental quality issues and conduct high quality research in the regions who are not presently enfranchised by the Sea Grant mechanism.

I would suggest that the regional marine research boards could set the agenda at the regional level with inputs from all interested parties. Once this agenda was set at the regional level, it could be forwarded to the national coordination board which could approve that agenda, minimizing the overlap with existing programs.

Then, the regional marine research centers would entertain proposals from multi-disciplinary, multi-institutional groups of scientists. These proposals would be forwarded to the national coordination board to be reviewed at the national level for the highest quality peer review under the auspices of the National Science Foundation which is a member agency of this board.

Once the reviews are in, the national board could forward the results back to the regional level, suggesting which programs were of the highest quality from a peer review perspective and which programs met the agenda and goals of the regional program as set forth by the regional research board.

I believe very strongly, Senator, that in this manner, we can disengage from the problems that are current in many of the local research programs in the sense that there is tremendous pressure, and, to some extent, some bias when people who make recommendations about particular research programs are also the ones who make the decisions about which programs get funded.

Senator **Chafee**. There is a possibility for a little conflict there. All right. You have one minute left.

Mr. **Farrington**. I will say in conclusion, Senator, that I have every confidence that we can make substantial progress and actually increase the rate of progress in dealing with some of these problems, and I know that all of us here feel very strongly that the research community stands ready to work with the public and with the regulatory agencies and with members of this subcommittee and others to achieve the objectives of this particular legislation.

Thank you.

Senator **Chafee**. Thank you very much, Dr. Farrington.

Now, we will go to Dean Duce.

STATEMENT OF ROBERT DUCE, DEAN AND VICE PROVOST FOR MARINE AFFAIRS, SCHOOL OF OCEANOGRAPHY, UNIVERSITY OF RHODE ISLAND

Mr. **Duce**. Thank you, Senator Chafee.

I want to congratulate you and Senator Mitchell and the other co-sponsors of this proposed legislation for your clear awareness of the critical problems facing our nation's estuarine and coastal marine environment.

I won't say many of the things that have been said by the previous distinguished speakers. I agree with almost all of their comments. I will add a few points, however.

I would like to support Dr. Kennett's suggestion that we move towards a designation of the 1990's as a Decade of Coastal Ocean Exploration. I think this is particularly important. Despite the growing concern that we have had about marine pollution, we really have not yet taken the decisive steps required to launch a major fundamental research program that would provide the information necessary for the future protection of our coastal region.

I think this legislation could certainly do that.

I believe the regional approach that you have suggested has very much to offer. Coastal marine ecosystems are so physically, chemically, and biologically complex that there is no one institution that has the expertise required to understand them in detail.

I believe the proposed approach in this legislation provides an expanded pool of scientists whose interdisciplinary expertise can be brought to bear over an extended period of time on these regional issues.

I feel, however, that multi-State projects can easily lead to some administrative problems if they are not handled very carefully, and I think over-coordination and possibly duplication of administrative structures and a complex bureaucracy have to be avoided if we want to produce high quality science.

Mr. Chairman, I believe that this program could be effectively administered by bringing into the administration some combination of the National Science Foundation and NOAA's National Sea Grant program, as several other speakers have mentioned.

In particular, I think the respected and time-tested peer review system of the National Science Foundation, coupled with its long history of support of fundamental basic research in the marine sciences and its growing interest and concern about the coastal marine environment, would ensure the high quality science that is absolutely necessary for the success of this program.

I also believe that the successful and visible Sea Grant program can provide a proven administrative structure while ensuring that we, at the same time, have a finger on the pulse of local and regional issues.

Again, I want to make my remarks very brief, and I want to congratulate the cosponsors of this legislation. I think it is extremely important for the future of our coastal marine environment.

I thank you for the opportunity to make these brief remarks.

Senator CHAFEE. Thank you very much, Dr. Duce, for those remarks.

I have a couple of questions here. Dr. Kennett, you make a strong case in your statement that regional marine problems are "remarkably, poorly understood, and that regional analyses have often been neglected by research institutions and the Federal agencies."

My question is this: would you agree that this legislation is not duplicating the current efforts of NOAA?

Mr. KENNETT. Yes, I agree. This is not a duplication of any existing programs. It is the regional inter-disciplinary, integrated approach that is central to this bill that makes it unique.

Senator CHAFEE. In his written statement, Dr. Duce suggests that we ask the State Sea Grant program directors to take on the job of writing the regional research plan and distributing funds for regional research. I am fair in saying that, aren't I, Dr. Duce?

Mr. DUCE. Yes, sir, you are.

Senator CHAFEE. In other words, you give a big hand to the regional Sea Grant councils. What do you think of that, Dr. Kennett?

Mr. KENNETT. I think they should be disarticulated from the existing Sea Grant administrative structure to keep it fresh.

Senator CHAFEE. Now, don't go too fast. What does disarticulated mean? Separated?

Mr. KENNETT. I mean separated, yes. Sea Grant runs in certain ways and has a long tradition of doing things in a certain way, and it has been very effective in certain ways. I should emphasize that. And it should be continued and, in fact, strengthened.

However, Sea Grant has not handled this kind of integrated approach in looking at the coastal resource and environmental problems, and I would favor keeping them separate.

Senator CHAFEE. Dr. Farrington, you made a point in your statement concerning the need to balance commitment to involvement in research and maintaining the scientific integrity of the research effort. Now, I at least agree that is an important point, and we have tried to address that in the current bill.

Generally, we provide some input of specific interest groups to the research planning process and then provide for public reports on the results of the research.

Does the bill provide a workable balance between the needs of scientists and the public?

Mr. FARRINGTON. As I indicated in my oral testimony, Senator, I believe that if you leave the major decision making on the quality of the science in the regional councils or the regional boards, then you run a significant risk of introducing a bias and political——

Senator CHAFEE. In other words, they will direct it all to their own people.

Mr. FARRINGTON. Well, in part they will and, in part, there will be the usual negotiations and trade-offs of "if you fund this part, I will fund that part or I will agree to fund this." Quality of scientific research loses out in that particular process.

That is my concern. I don't want to over-emphasize that. I just have that concern. I see it happening at the State level on a number of occasions. I have seen it happen in some instances, a few instances, in the EPA's estuaries and bays program.

Senator CHAFEE. The one thing I got out of what every single one of you said is that we really have to have the best possible research done with the premier people. That came through for me.

It seems to me what we are doing here—everybody is for this program; nobody is against it on the panel, but the question is, how do we get the money out there in the best fashion without bias or influence coming so that it is diverted into less than the premier way?

Let me ask a question. I think it was you, Dr. Farrington, as I wrote it down, that you sought cooperation between the scientists and the policy makers. Wasn't that your statement?

Mr. FARRINGTON. That is correct, sir.

Senator CHAFEE. Who are the policy makers? Who are you thinking about? The politicians? Who are policy makers?

Mr. FARRINGTON. I am thinking of both elected and appointed officials at the State, the local, and at the Federal level.

Senator CHAFEE. And how do you get this cooperation?

Mr. FARRINGTON. Well, sir, I believe that if you can set the agenda of what the goals are for a particular program, that is a very important function at the regional and local level interactive with the Federal agencies at the Federal level.

Once you set those goals, then you ask the scientific community in all its diversity—Sea Grant, outside of Sea Grant, organizations such as the National Audubon Society—to prepare proposals in a multi-disciplinary and multi-institutional fashion within those regions, submit these proposals, and have them peer reviewed for the quality of the research that is responding to the goals rather than having the people who are setting the goals also making the decisions about the quality of the research.

Senator CHAFEE. But I must say, we get into a problem here. I mean, we get the best possible research done. You folks go out there and study it, and you determine that in the Gulf of Maine, the primary problem is toxic waste coming down the rivers, that is, from the paper mills way up stream. It is coming down the Penobscot River and is polluting the Gulf of Maine, and then you buttress that with a great deal of scientific support.

And that is great. It makes a lovely report with a picture on the cover, and we all wonder what happens next.

That is where you think you have to keep the policy makers involved as you go along and be alert.

I must say I think the best groups are probably the environmental groups who will hold a big press conference, just like the front page of the New York Times. Did you see it two days ago about the degradation of the oceans? It was a conference that was held by essentially environmental groups.

It is hard to get the politicians' attention in these things until it rises to a high enough level.

Dr. Duce, in proposing that regional research centers be set up, that is, in our bill, of all the marine research institutions in the region, we had in no way intended to exclude the Sea Grant universities, but we expected Sea Grant to play a lead role in the effort. We are concerned that all the scientists at the various institutions have an equal role in developing research plans and have an equal shot at research project funding.

We are concerned that scientists who did not have an equal shot at developing plans would not participate in the planning process and would not work within the final plan once it was developed. They would be on the outside, so they wouldn't be so enthusiastic about the overall effort since they weren't in it.

Could you clarify for us whom you suggest be responsible for developing research plans and whom should be responsible for making grants for regional research? Give us the Duce theory once again.

Mr. DUCE. Well, Senator, I think that we can certainly make use of the regional Sea Grant councils that are set up already, although that would just be part of the process. There would be the necessity of adding people to those councils and adding representation from the various parts of the scientific and political community that would be involved and concerned about the marine environment.

I believe bringing in the National Science Foundation into the review process will ensure that it is a very objective process, a very fair process, and that the very finest science will come out of it.

I believe it is the combination of the National Science Foundation's long tradition of peer review and high quality science with a structure that is similar and partly the same as Sea Grant's regional councils that can produce the strength and the fairness and the high quality science that we all want.

Senator CHAFEE. Okay, well, I want to thank each and every one of you for coming. I think we have narrowed down the issues that we have to wrestle with now, and we will be doing that, and we might well be giving you a call at some time for further clarification if we seek it.

Again, Dr. Kennett, Dr. Farrington, and Dr. Duce, thank you for coming.

I just want to say that Senator Durenberger who was here did not have a statement, but I have a statement by Senator Warner which I will now put in the record.

Thank you all once again for coming.

The subcommittee stands adjourned.

[Whereupon, at 3:48 p.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

[Statements submitted for the record and the bill S. 2068 follow:]

STATEMENT OF
TUDOR T. DAVIES
DIRECTOR, OFFICE OF MARINE AND ESTUARINE PROTECTION
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

April 28, 1988

Good afternoon. I am Tudor Davies, Director of the Office of Marine and Estuarine Protection of the U.S. Environmental Protection Agency (EPA). It is a pleasure to be here today to testify before you on research concerning the marine environment.

Our estuarine and near-coastal waters are a vital resource, providing habitat for marine resources, abundant fishing grounds, and significant recreational opportunities. However, this resource receives pollutant inputs from numerous sources, is subject to stresses associated with resource exploitation, and also is subject to pressures associated with the burgeoning population growth taking place in coastal areas.

Over the last few months, representatives of EPA have appeared before the relevant House and Senate committees to testify as to the importance of our estuarine and near-coastal waters and our activities in seeking to protect and restore this resource. Just last week, the Agency's Deputy Administrator had appeared before this Subcommittee to offer testimony on near coastal water issues.

I will not repeat the substance of the Agency's previous testimony, but I do wish to point out that we share your concerns over the state of our estuarine and near coastal waters, and that we believe that well-focused and carefully planned marine research and monitoring plays an important role in developing effective measures to protect and restore our coastal waters.

As I stated in my March 24 testimony before another Subcommittee, EPA began its Near Coastal Water Program as part of Administrator Lee Thomas' strategic planning process in the fall of 1985. The Near Coastal Water (NCW) Initiative was an effort to develop a 10 to 15 year strategic plan for EPA to improve its management of NCW environmental quality. The Agency recognized that the unique features of these waters placed them at greater risks for degradation and thus in greater need of management attention.

EPA has intensified efforts at its own research laboratories to provide practical research products to help coastal managers solve problems. This new initiative is focusing on such research needs as characterization of point and non-point sources of pollution, assessment of exposure of living marine resources to toxic pollutants, and quantitative ecological risk assessments for managing near coastal waters. Additionally, monitoring methods will be developed to characterize the status of near coastal water ecosystems and measure the success of management actions.

An example of a geographic/site-specific approach to managing waterbodies is EPA's national estuary program (NEP). EPA's national estuary program began in 1985 and was given statutory authority under the 1987 amendments to the Clean Water

Act. Three characteristics distinguish EPA's approach to addressing pollution in estuaries. First, we target basin-wide assessment of problems and causes. Second, we integrate the use of all available regulatory tools and cleanup techniques addressing point source pollution, nonpoint source pollution, land-use management, and coastal resource protection. Finally, we employ the concept of collaborative problem solving which includes, and utilizes the resources of all relevant federal, State, and local government agencies as well as public interest and user groups. EPA provides the technical expertise and the organization umbrella to bring together all the parties affecting and affected by near coastal water quality.

Currently, EPA has selected six estuaries to be in the NEP. These are: Buzzards Bay in Massachusetts; Narragansett Bay in Rhode Island; Long Island Sound in Connecticut and New York; Albermarle/Pamlico Sounds in North Carolina; San Francisco Bay in California; and Puget Sound in Washington State. We expect that the program will expand to include up to a total of about 12 estuaries of national significance by the end of FY 1988.

EPA opposes S. 2068 for the following reasons:

* We agree with the Department of Commerce that it strongly duplicates and competes with existing programs, and there are already sufficient coordinating mechanisms; and,

* The Department of Justice has questioned the constitutionality of the institutional arrangements which would be created by the bill.

This concludes my testimony, and I would be pleased to answer any questions you might have.

STATEMENT BY

JOHN J. CAREY
DEPUTY ASSISTANT ADMINISTRATOR FOR OCEAN SERVICES
AND COASTAL ZONE MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

APRIL 28, 1988

Mr. Chairman and Members of the Subcommittee:

Thank you for this opportunity to present the views of the Department of Commerce on S. 2068, the "Marine Research Act of 1988."

As we have testified to this Subcommittee and others, there are serious problems in the marine and near-shore environment, including loss and modification of habitat, toxic contamination, eutrophication, and declining economic and ecological productivity.

While the underlying objective of S. 2068 -- to promote research related to protection and preservation of the marine and near-shore environment -- is meritorious, as pointed out by the Department of Justice in a letter to the Chairman of the full Committee, the bill contains provisions which would violate the Appointments Clause of the United States Constitution. Even if the bill were to be revised to remove this conflict, the Department of Commerce would strongly oppose the bill because it would establish a marine research coordination structure and authorize marine and near-shore research facilities and activities which in many respects would duplicate and compete with existing, legislatively-mandated infrastructure and responsibilities of the National Oceanic and Atmospheric Administration (NOAA). Dr. Evans, NOAA Administrator, testified last week before this Subcommittee regarding NOAA's current comprehensive program of assessments of the effects of human activities on the marine environment. Without repeating his testimony, I would like to provide you with examples of the problems S. 2068 would create.

Research Programs and Coordination

Specifically, S. 2068 would establish a Marine Research Coordination Board (MRCB) which would overlap, both functionally and in its membership, with the National Ocean Pollution Planning Board (NOPPB) established by the National Ocean Pollution Planning Act of 1978, and housed in the Office of the Chief Scientist of NOAA. For example, proposed subsection 404(d) identifies twelve areas of investigation as within the purview of the MRCB -- ten of these already are within the purview of NOPPB. Proposed subsection 408(a) would place representatives from eight Federal agencies on the Board -- six of which are represented on the NOPPB. The existing NOPPB already takes into account regional variations in research needs, and includes representatives of diverse regions in its nationwide planning efforts. Proposed subsection 404(d) of S. 2068 authorizes establishment of ten Regional Marine Research Centers. While these centers would not literally duplicate existing NOAA facilities in terms of regional boundaries and the scope of their authorized research programs, they would overlap substantially the capabilities and activities of NOAA's National Marine Fisheries Service (NMFS) research centers and laboratories, and NOAA's Environmental Research Laboratories.

For example, NOAA's Northeast Fisheries Center conducts research on North and Mid-Atlantic offshore, coastal and estuarine species and their habitats. Its laboratories study effects of ocean dumping, oil and gas development, industrial and domestic contaminants, and urban and industrial expansion on coastal and offshore fisheries, marine mammals and endangered marine species. NOAA's Pacific Marine Environmental Laboratory conducts studies to understand the ability of estuaries to accommodate pollutant inputs. NOAA's Great Lakes Environmental Research Laboratory conducts a continuing program with the Environmental Protection Agency (EPA), the United States Fish and Wildlife Service, and Canadian agencies to develop and improve understanding of processes controlling cycling of organic pollutants.

NOAA and EPA have worked together successfully for a number of years on a wide range of activities directed to protection and preservation of the marine and near-shore environment. NOAA has provided scientific information and support, and EPA has been in the leading role in regulatory, enforcement and spill response efforts.

For example, NOAA has worked with EPA since early 1970's to characterize alternative ocean waste disposal sites, including the area around what is now the 106-mile dump site, as well as the 12-mile site which has been closed by EPA. Our scientific advice provided much of the technical basis for EPA's regulatory decision to close the 12-mile site.

In the arena of oil and hazardous materials spill response, NOAA provides on-scene scientific support to EPA and other agencies involved in cleanup efforts. Similarly, NOAA provides to EPA much of the scientific information it needs for cleanup of Superfund sites in coastal areas -- and about 40 percent of the sites on EPA's National Priorities List are in coastal counties.

The established NOAA-EPA relationship takes into account NOAA's scientific expertise, coupled effectively with EPA's regulatory, enforcement and cleanup responsibilities. S. 2068, if enacted, would make EPA responsible for managing research programs and facilities which overlap significantly with existing NOAA programs and facilities. The result would be to confuse research responsibilities, and create conflicts which do not now exist. NOAA sees no reason to change the balanced and effective working relationship it now enjoys with EPA.

Mr. Chairman, NOAA presently serves as a coordinating link between Federal research programs and the resource managers and regulatory agencies involved in prevention of and response to environmental degradation. When the need indicates, NOAA has used its broad authority to establish appropriate programs and take necessary action. For example, we have recently established a National Benthic Surveillance Program to monitor the health of the Nation's near-shore marine environment; and we are developing a Memorandum of Understanding with the Corps of Engineers and a pilot program to use the combined capabilities of NOAA and the Corps to restore and enhance fisheries habitats. We have been instrumental in influencing Federal policy decisions to conserve important coastal and marine ecosystems which were involved in a number of activities (e.g., Westway; the Portsmouth, VA oil refinery; the Northern Tier Pipeline; the Eastport, ME oil refinery; the Corpus Christi port development project; and Georges Bank oil and gas exploration).

The National Environmental Satellite, Data, and Information Service (NESDIS) is engaged in a number of near-shore and estuarine activities. Examples include work with the Chesapeake Bay Program on the development of methodologies to use Advanced Very High Resolution Radiometer (AVHRR) data from NOAA satellites to monitor chlorophyll, turbidity and surface temperature in estuarine and near-shore oceanic waters. Additionally, NESDIS scientists, working with NMFS, have recently used AVHRR data to monitor the recent North Carolina red-tide outbreak.

NESDIS scientists have more than a decade of experience in developing a digital data base of oceanographic data from near-shore and marine waters. Cooperation with other Federal agencies, including EPA, and the Department of the Interior (as well as working with NOAA laboratories), has resulted in the establishment of an accessible data base of quality-controlled environmental data supporting pollution, marine resources and coastal physical processes investigations. Additionally, since 1982 the National Oceanographic Data Center (NODC) has provided taxonomic code support to EPA data systems. NODC has supplied thousands of numeric codes to EPA and State investigators monitoring the quality of coastal and near shore waters and resources. Common taxonomic terminology for biological data collected by NOAA, EPA, Interior, and the States is a critical element supporting the assessment of the quality of the Nation's marine environment.

As Dr. Evans testified before this Subcommittee last week, our cooperative relationship with EPA is effective and we are building further on that solid base.

In conclusion, while we are concerned about the range of problems in the marine and near-shore environment, we are convinced that S. 2068 is not the answer. It will not add to NOAA's ability to address coastal pollution issues. Rather, it will confuse the current coordination structure and unnecessarily duplicate existing NOAA programs. A better approach would utilize existing programs and authorities, including systems for planning and the conduct of research. This would give priority to addressing resource managers' critical information needs and maximize efficiency by utilizing generic strategies whose results can be applied elsewhere (thus avoiding unnecessary duplication). We feel this approach, as opposed to the approach of S. 2068, will best address nationally significant coastal degradation problems.

Thank you Mr. Chairman. This concludes my prepared statement; I would be happy to respond to any questions the Subcommittee may have.

Testimony of Kenneth M. Curtis, President of Maine Maritime Academy before the Senate Subcommittee on Environmental Protection of the Committee on Environment and Public Works, Washington, D.C., April 28, 1988.

THANK YOU FOR THIS OPPORTUNITY TO TESTIFY IN FAVOR OF SENATE BILL S. 2068, THE "MARINE RESEARCH ACT OF 1988."

I COME BEFORE THIS COMMITTEE REPRESENTING MAINE MARITIME ACADEMY AND AS ONE WHO SHARES A COMMITMENT TO THE PRESERVATION OF MAINE'S UNIQUE ENVIRONMENT AND IT'S 3,500 MILE COASTAL RESOURCE. BY WAY OF BACKGROUND, MAINE MARITIME ACADEMY IS AN OCEAN-ORIENTED COLLEGE THAT OPERATES THE ONLY DEEP-SEA RESEARCH VESSEL STATIONED NORTH OF CAPE COD, MASSACHUSETTS.

THE SHIP IS DEDICATED TO SERVING THE ASSOCIATION FOR RESEARCH IN THE GULF OF MAINE, A CONSORTIUM OF SOME 75 SCIENTISTS FROM THE UNIVERSITY OF MAINE, THE STATE DEPARTMENT OF MARINE RESOURCES, BIGELOW LABORATORIES, AND THE MAINE GEOLOGICAL SURVEY.

THE PEOPLE OF MAINE APPRECIATE THE FRAGILITY OF IT'S RICH NATURAL RESOURCES AND TAKE GREAT PRIDE IN THE FACT THAT THEIR STATE IS A LEADER IN STRONG ENVIRONMENTAL LEGISLATION. FORMER SENATOR EDMUND MUSKIE WAS THE LEADER IN FASHIONING THE FEDERAL ENVIRONMENTAL LEGISLATION THAT SERVES US SO WELL TODAY. WE FROM MAINE ARE PROUD THAT YOUR CHAIRMAN, SENATOR MITCHELL, IS SO EFFECTIVELY CONTINUING THAT COMMITMENT.

IN SPITE OF ALL THAT HAS BEEN ACCOMPLISHED SINCE THE 1960'S MAINE PEOPLE ARE FEARFUL OF THE STRESS THAT THE PRESENT RATE OF GROWTH IS PLACING ON OUR COASTAL WATERS AND BEYOND; THAT THREATEN OUR BOUNTIFUL FISHERIES AND OUR WAY OF LIFE. ALTHOUGH MUCH OF MY TESTIMONY CONCERNS ITSELF WITH THE GULF OF MAINE, WE ALSO

RECOGNIZE THAT THIS IS NOT A PROBLEM UNIQUE TO MAINE.

THE COASTAL WATERS ON OUR ATLANTIC, PACIFIC, AND GULF COASTS HAVE FOR CENTURIES BEEN OF IMMENSE VALUE TO THIS COUNTRY: FOR THEIR FISHERIES AND MINERAL RESOURCES, FOR PROVIDING EFFICIENT TRANSPORTATION, AND FOR THEIR VARIED AND NUMEROUS AMENITIES. NO ONE WOULD DISAGREE THAT WISE MANAGEMENT AND CONSERVATION MEASURES ARE A NECESSITY IF THESE WATERS ARE TO RETAIN THEIR VALUE FOR FUTURE GENERATIONS. BUT THE FORMULATION OF RATIONAL POLICIES FOR MANAGING THESE WATERS CAN NEVER BE ANY BETTER THAN THE WELL-PLANNED BODY OF SCIENTIFIC KNOWLEDGE MADE AVAILABLE TO DECISION-MAKERS.

IT IS UNFORTUNATE THAT IN ALL TOO MANY INSTANCES THE QUALITY OF SCIENTIFIC INFORMATION AVAILABLE RUNS FAR BEHIND THE PRESSURES BEING PLACED UPON THESE WATERS, PRESSURES WHICH CONTINUE TO INCREASE AT AN ALARMING RATE. EXAMPLES AROUND THE COUNTRY OF TROUBLED WATERS ARE MANY, INCLUDING SUCH NOTORIOUS EXAMPLES AS CHESAPEAKE BAY AND BOSTON HARBOR. FORTUNATELY, NOT ALL OF OUR COASTAL SEAS ARE IN THIS CONDITION; IN FACT, THE MAJORITY ARE BASICALLY HEALTHY, BUT WITHOUT FORESIGHT AND APPROPRIATE MEASURES, THEIR QUALITY WILL DETERIORATE, AND THE COST OF RESTORATION, IF SCIENTIFICALLY POSSIBLE, WILL BE STAGGERING.

THE HISTORY OF OUR HANDLING OF ENVIRONMENTAL ISSUES PLAINLY DEMONSTRATES THAT OUR TENDENCY HAS BEEN TO RESPOND TO CRISES, NOT TO ANTICIPATE THEM. THIS UNDERLYING ATTITUDE OF COMPLACENCY WELCOMES THE UNEXPECTED.

WE BELIEVE THAT WHILE THE WATERS IN THE GULF OF MAINE ARE NOT YET THREATENED BY THE LEVELS OF POLLUTANTS WHICH WE WATCH

PLAGUING OTHER AREAS TO OUR SOUTH, WE CANNOT SIT IDLY BY AND ALLOW FATE TO DEAL A SIMILAR HAND.

THERE ARE ALREADY EARLY WARNING SIGNS AS CHARLES S. YENTCH, FORMER DIRECTOR OF THE BIGELOW LABORATORY FOR OCEAN SCIENCES, POINTED OUT AT THIS COMMITTEE'S HEARING ON SEPTEMBER 8, 1987, WHEN HE SAID:

> "THE SIGNS ARE ALL OUT THERE. . . SEA LEVEL RISE, POPULATION GROWTH ALONG THE COAST, RED TIDE OUTBREAKS, DRASTIC CHANGES IN FISH ABUNDANCE, TOXIC METALS, ACID RAIN, ACID FOGS, AND SO FORTH"

WE HAVE RECOGNIZED THE EARLY WARNING SIGNS, AND HAVE BEGUN TO ORGANIZE OUR SCIENTIFIC TALENT TO MEET THE CHALLENGE. THE ASSOCIATION FOR RESEARCH ON THE GULF OF MAINE WHICH HAS ADOPTED A CONSORTIUM APPROACH TO SOLVING THE MYRIAD OF RESEARCH PROBLEMS, IS SEEN AS THE MOST EFFECTIVE. MAINE LOST VALUABLE TIME WHILE MANY SMALL ENTITIES VIED FOR LEADERSHIP ROLES IN OCEAN RESEARCH ACTIVITIES. THE CONSEQUENCES WERE PREDICABLE AND RESEARCH EFFORTS HAVE LAGGED FAR BEHIND THOSE THAT PRESERVATION OF OUR RESOURCE DEMANDS. BUT WE ARE ON THE RIGHT TRACK NOW.

WE ALL SHOULD HAVE LEARNED FROM THE MISTAKES OF THE PAST AND FROM OTHERS THAT COMPLACENCY OVER OUR SEEMINGLY PRISTINE WATERS IS ASKING FOR TROUBLE. IT IS NOW CLEAR THAT IT IS TIME FOR A WELL COORDINATED REGIONAL APPROACH TO ADDRESSING TIMELY RESEARCH ISSUES, AN APPROACH NOT NOW POSSIBLE UNDER EXISTING FUNDING MECHANISMS.

AS ONCE ISOLATED PROBLEMS ARE BEGINNING TO ATTRACT PUBLIC ATTENTION, OUR PRESENT SCIENTIFIC KNOWLEDGE OF THE GULF OF MAINE IS WOEFULLY INADEQUATE TO WISELY MANAGE THIS RESOURCE. MUCH OF

OUR CURRENT RESEARCH ACTIVITIES SEEM TO BE DIRECTED TOWARD SPECIFIC PROBLEMS WITH LESS BROADLY DEFINED OBJECTIVES. WHILE THESE EFFORTS NEED TO CONTINUE, THEY CONTRIBUTE LITTLE TOWARD UNDERSTANDING THE UNIQUE ECOSYSTEMS OF THE GULF OF MAINE, AND I EXPECT OF OTHER COASTAL REGIONS OF THE UNITED STATES, AS WELL.

WHILE ADVANCES ON MANY SCIENTIFIC FRONTS HAVE BEEN MADE IN THE LAST TWO DECADES, WE STILL HAVE ONLY THE CRUDEST MODELS FOR INTERPRETING AND PREDICTING THE PROCESSES OPERATING IN COASTAL MARINE ECOSYSTEMS.

UNTIL A PLANNED AND COORDINATED EFFORT IS MOUNTED, PROGRESS WILL BE SLOW. THE NEED, THEREFORE, FOR COMPETENTLY COORDINATED RESEARCH PLANS WHICH HAVE BEEN CAREFULLY THOUGHT THROUGH AND EFFECTED AT THE LOCAL LEVEL, ARGUES FOR THE CONCEPT OF INDEPENDENT, REGIONAL MARINE RESEARCH CENTERS.

NO MECHANISM PRESENTLY EXISTS THAT HAS THE CAPABILITY TO COORDINATE FEDERAL RESEARCH ACTIVITIES WITH THOSE OF STATE ORGANIZATIONS AND PRIVATE INSTITUTIONS. IN MY OPINION, THERE IS NO MECHANISM THAT COULD SO IMPARTIALLY AND EFFICIENTLY HARNESS EXISTING CAPABILITIES.

WITHOUT SOUNDING OVERLY CRITICAL, EXPERIENCE TELLS ME THAT THE NATURE OF SUCH GOVERNMENTAL AND PRIVATE ENTITIES IS ONE OF BEING UNDER FUNDED AND OVER TAXED BY SCIENTIFIC AND ADMINISTRATIVE DEMANDS, LEAVING PRECIOUS FEW RESOURCES FOR THE NECESSARY RESEARCH THAT MUST BE DONE.

A SYSTEM OF INDEPENDENT RESEARCH CENTERS IS THE ONLY REALISTIC VEHICLE TO DEVELOP AN OVERALL LONG-RANGE COORDINATED RESEARCH PLAN. THROUGH SUCH A MECHANISM AND WITH THE EXPENDITURE

OF FEW ADDITIONAL RESOURCES, WE CAN EXPAND AND IMPROVE RESEARCH AND MONITORING ACTIVITIES.

THE REGIONAL APPROACH WILL ADD TO EFFICIENCY AND EFFECTIVENESS. ENVIRONMENTAL CONDITIONS AND THE COASTAL ESTUARIES WITH THEIR RELATED ECOSYSTEMS DIFFER FROM AREA TO AREA. REGIONAL AND LOCAL INPUT IS ESSENTIAL TO PLANNING AND COORDINATING ACTIONS. STATE GOVERNMENT, STATE LEGISLATURES, AND PUBLIC SUPPORT MUST BE ADDED TO FEDERAL INITIATIVES IF WE ARE TO BE SUCCESSFUL.

IN THE GULF OF MAINE, WE ALSO NEED TO COORDINATE EFFORTS WITH CANADIAN PROVINCIAL AND FEDERAL ACTIVITIES TO PRESERVE THIS VALUABLE COMMON RESOURCE THAT WE SHARE. AS AN EXAMPLE THE GOALS OF SUCH EXISTING AGENCIES AS NOAA AND EPA ADDRESS IN SOME WAYS THOSE FOCUSED UPON HERE, THEY PLAINLY ARE NOT STRUCTURED TO RESPOND TO THE GROWING NEEDS BEFORE US. THEY CANNOT, WITHIN A MULTI-STATE REGION, COORDINATE RESEARCH AND MONITORING PROGRAMS AMONG THAT REGION'S RESEARCH INSTITUTIONS. THEY ARE NOT STRUCTURED TO AWARD RESEARCH MONIES IN A MERIT BASED, COMPETITIVE MANNER AND THEY ARE NOT IN A POSITION TO FORMULATE LONG-RANGE RESEARCH PLANS WHICH MOBILIZE THE STATE AND PRIVATE SECTOR. THESE ARE ESSENTIAL CHARACTERISTICS OF THE PROPOSED LEGISLATION.

THE CLEAREST DANGERS IN CREATING ANY NEW GOVERNMENT-SPONSORED ORGANIZATION ARE TOP-HEAVY ADMINISTRATIONS, POTENTIAL DUPLICATION OF EXISTING PROGRAMS, AND THE INEFFICIENT USE OF LIMITED RESOURCES AND EQUIPMENT. THE MARINE RESEARCH ACT OF 1988 HAS BEEN CREATED TO ADDRESS EXACTLY THOSE CONCERNS. ONLY 1/6 OF THE $3 MILLION MAY BE SPENT ON ADMINISTRATION, WHILE 5/6 MUST GO

FOR RESEARCH AND MONITORING GRANTS. THE BILL IS ALSO DESIGNED TO ELIMINATE DUPLICATION THROUGH ITS COORDINATION WITH RELEVANT AGENCIES, AND IS DESIGNED TO MAXIMIZE THE USE OF LIMITED RESOURCES AND EQUIPMENT.

I WOULD INVITE THE MEMBERS OF THIS COMMITTEE TO REVIEW THE SUCCESS OF THE GREAT LAKES WATER QUALITY AGREEMENT WHICH CREATED A SMALL OFFICE UNDER THE U.S. CANADIAN JOINT COMMISSION TO COORDINATE STATE, FEDERAL, AND CANADIAN AGENCIES IN A MASSIVE CLEAN UP EFFORT. CLEARLY, THE CONCEPT OF MARINE RESEARCH CENTERS WOULD PROVIDE THE NECESSARY COORDINATING AND PLANNING VEHICLE, BUT IT WOULD ALSO HAVE SOME FUNDS TO CONDUCT RESEARCH IN THOSE AREAS NOT BEING ADDRESSED BY OTHER ONGOING RESEARCH ACTIVITIES.

THE MARINE RESEARCH ACT OF 1988 WOULD ALSO SUPPORT BOTH BASIC AND APPLIED RESEARCH. THIS MAY BE ONE OF THE MORE IMPORTANT, YET LEAST TOUTED ASPECTS OF THE LEGISLATION: IT ENCOURAGES A TEAM EFFORT AMONG AGENCIES, SUCH AS THOSE IN STATE AND FEDERAL GOVERNMENT CONCERNED WITH FISHERIES AND POLLUTION, WITH THE BASIC RESEARCH EFFORTS OF UNIVERSITIES AND PRIVATE LABORATORIES. THERE DOES NOT NOW EXIST ANY SUCH PROGRAM WHICH WOULD ENCOURAGE SUCH COLLABORATION IN SO VIGOROUS AND COORDINATED A FASHION. THIS IS UNFORTUNATE, SINCE IT IS THE MARRIAGE OF BASIC AND APPLIED RESEARCH THAT YIELDS FRUITFUL RESULTS. FOR THE TWO APPROACHES TO RESEARCH, BASIC AND APPLIED, TO CONTINUE ALONG SEPARATE PATHS, FULLY EXPECTING, EVEN HOPING, THAT SOMEDAY THE RECONDITE FINDINGS OF BASIC RESEARCH WILL MEET THE NEEDS OF A VERY IMPORTANT AND APPLIED PROBLEM, IS A GAMBLE THAT WILL NOT ALWAYS PRODUCE A WINNER -- AT LEAST NOT ON TIME SCALES IN SYNC

WITH THAT OF THE MOUNTING PROBLEMS IN OUR COASTAL WATERS.

THE VALUE OF BASIC RESEARCH CANNOT BE OVERSTATED -- NOR CAN IT EASILY BE DEFINED. EACH NEW BIT OF SCIENTIFIC INFORMATION HAS A VALUE WHICH IS IMPOSSIBLE TO MEASURE AGAINST TODAY'S STANDARDS -- THE FUTURE PUZZLES IT MIGHT SOLVE HAVE YET TO BE EVEN THOUGHT OF; ITS VALUE SIMPLY CANNOT BE PREDICTED.

SCIENTISTS KNOW FULL WELL THAT GROWING PRESSURES ON THE ENVIRONMENT WILL CONTINUE. AND HEREIN RESTS THE INHERENT BEAUTY OF MELDING BASIC AND APPLIED SCIENCES. WE KNOW THAT PRESSURES WILL MOUNT, THAT NEW PROBLEMS WILL APPEAR, AND THAT THE NEED FOR FUNDAMENTAL SCIENTIFIC INFORMATION WILL BECOME MORE PRESSING. WE KNOW THAT INEVITABLY THERE WILL BE AN AS-YET-UNCLEAR NEED, AND THAT WE MUST BE READY TO FACE IT. THE QUESTION IS ONLY ONE OF HOW TO STRUCTURE THE APPROACH.

OUR GOVERNMENT SPENDS HUNDREDS OF MILLIONS OF DOLLARS EACH YEAR ON WHAT SOME MIGHT CONSIDER TO BE ESOTERIC SCIENTIFIC FOLLY. AND AS FUNDING BECOMES TIGHTER THE NEED TO JUSTIFY SCIENTIFIC RESEARCH BUILDS AND NEW STRATEGIES ARE DEVISED TO MAKE THEM MORE PALATABLE AND HENCE FUNDABLE. RECENTLY NEWSWEEK MAGAZINE TOLD OF THE TREND TOWARD BIG SCIENCE PROJECTS, PROJECTS ROMANTIC ENOUGH TO ATTRACT ATTENTION AND THE PUBLIC'S IMAGINATION, BUT WHICH SWALLOW UP MONEY AND STARVE THE SMALLER-SCALE RESEARCHERS. THE TREND IN MARINE ENVIRONMENTAL SCIENCE IN THIS COUNTRY MUST BE CAREFUL NOT TO FOLLOW SUCH A LEAD. SCIENCE ADVANCES IN SMALL STEPS AND FROM MANY, INDEPENDENT MINDS THE TREND WITH RESPECT TO RESEARCH AND MONITORING IN OUR COASTAL WATERS SHOULD BE TOWARD THE LOCAL, DISCRETE AND MANAGEABLE-SIZED RESEARCH PROJECTS.

LOCAL RESEARCH PROJECTS SHOULD BE STREAMLINED FOR EFFICIENCY, WHICH RETAIN THE INDEPENDENT IMAGINATIONS OF OUR COUNTRY'S SCIENTISTS. WE ALSO MUST GUARD AGAINST BUILDING UP THE BUDGETS AND ADMINISTRATIVE STRUCTURES OF ALREADY UNWIELDY AGENCIES AS THE ANSWER. BIGGER SIMPLY IS NOT BETTER.

IN SUMMARY, THE STRENGTH OF THIS LEGISLATION IS FROM ITS CONCENTRATION ON COORDINATED AND PLANNED RESEARCH WHICH IS DIRECTED TO THE DIFFERING CONDITIONS AND NEEDS OF THE REGIONS. ITS FUNDING IS RESERVED FOR RESEARCH WITH A CAP PLACED ON LESS PRODUCTIVE ADMINISTRATIVE EXPENSES.

WHILE THE PAST AND THE RESILIENCY OF OUR COASTAL ECOSYSTEMS HAS BEEN FORGIVING, WE MUST FACE THE FACT THAT THE FUTURE WILL NOT. THROUGH MASSIVE DEFICITS, WE IN THE UNITED STATES ARE PASSING ALONG A HUGE DEBT TO FUTURE GENERATIONS. WE SIMPLY MUST NOT ADD IRREVERSIBLE ENVIRONMENTAL DAMAGE TO THAT DEBT, NOR DENY FUTURE GENERATIONS THE OPPORTUNITY TO ENJOY A QUALITY OF LIFE THAT YOU AND I HAVE KNOWN.

TESTIMONY BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

ON

S.2068

A Bill to Amend the Marine Protection, Research,
and Sanctuaries Act and proposing

"THE MARINE RESEARCH ACT OF 1988"

BY

R. K. DEARBORN, PRESIDENT, SEA GRANT ASSOCIATION

ON BEHALF OF

THE SEA GRANT ASSOCIATION

AND

THE NATIONAL ASSOCIATION OF STATE UNIVERSITIES
AND LAND GRANT COLLEGES

TESTIMONY
S.2068 "THE MARINE RESEARCH ACT OF 1988"

R. K. DEARBORN

SEA GRANT ASSOCIATION

NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES

Thank you, Mr. Chairman, for the opportunity to provide testimony with regard to S.2068, a bill to establish "The Marine Research Act of 1988." I am Ronald K. Dearborn, Director of the Sea Grant College Program in Alaska and also the President of the Sea Grant Association. Before moving to Alaska several years ago, I administered the Sea Grant program in Maine and continue to have a substantial interest in the important marine issues in that region as well as those in the Northwest and Alaska.

The Sea Grant Association consists of 40 Colleges, Universities, Research Centers, and Consortia all dedicated to preservation and wise use of the nation's coastal and marine resources. The National Association of State Universities and Land Grant Colleges (NASULGC) is composed of 149 colleges and universities with a total enrollment of about 3 million students. These institutions bestow a majority of the graduate degrees granted in the country.

Sea Grant has developed over the past decade to become the nation's coastal ocean program. Working through a network of 29 major programs, Sea Grant involves 270 colleges and universities throughout the nation in addressing important coastal and marine issues. Sea Grant connects academic marine science with state and federal agencies and coastal marine industries to sustain and advance the economic, and social well-being of the nation by increasing the understanding, conservation, development, and wise use of the nation's coastal ocean through focused research and education programs.

We enthusiastically welcome a bill which addresses coastal ocean and marine resource issues and which would provide critically needed funding for research focused on ensuring the quality and productivity of our coastal ocean and estuaries. We agree with the need for more effective regional planning, coordination, data collection/dissemination, and public reporting. We would hope that the Sea Grant College Program would be a partner in any program focused on the quality and productivity of our coastal oceans, and offer our experience in:

- planning and focusing research to meet identified needs,
- networking government, academia, and marine industries together to address issues of mutual interest, and
- developing and distributing to identified users credible reports on a variety of technical and scientific topics.

Sea Grant is really a mechanism for matching science with agency and constituency needs, rather than an autonomous program. It accomplishes this through networking within the academic community and of networking the academic community with government and industry. Let me provide examples of how Sea Grant networking has been successful, and how we might build off these examples to ensure the success of a regional marine environmental research program. Sea Grant has had neither the mandate nor the resources to undertake regional planning and coordination. In fact, because the required matching funds generally come from state and university budgets, there is some impediment to regional activity. Despite that, Sea Grant has often provided the leadership for multi-agency and regional planning, and I know of no other entity which has consistently provided such leadership in each of the regions outlined in your bill. Although the context of these examples is limited, I hope they provide some insight into the valuable role Sea Grant might play in using similar mechanisms to attain the goals of The Marine Research Act of 1988. In picking these examples, let me refer to Maine and more broadly New England, an area with which you and I share a mutual point of reference.

- Sea Grant has a reference which goes well beyond state boundaries. Even when Sea Grant initiated the Maine Fishermen's Forum, it was the Maine forum by name only. As far as Sea Grant was concerned, fishermen from places like Pt. Judith and the Maritime Provinces were critical participants. With the Forum securely established, Sea Grant stepped back and handed the Forum over to the industry. We note that the industry continues the broad context. Of course the Sea Grant institution in northern New England itself is an example of a regional program which works. What better example of regional planning and research exists than the Maine-New Hampshire Sea Grant College Program.

- Sea Grant is able to initiate important programs without demanding ownership. Clearly the first years of research and marine advisory education which provided the basis for the Maine Lobster Institute, another regional entity, were all Sea Grant supported. That promising research institute is now off to a strong start with its university/industry base of support.

- Sea Grant is able to soften traditional institutional boundaries to make way for cooperation across university, government, and private laboratory lines. Sea Grant played a major role in helping to establish ARGO Maine, not only in helping to pull people together, but also in funding researchers from the Department of Marine Resources and Bigelow Laboratory in cooperative projects with faculty of the University of Maine. In addition, Sea Grant funded much of the undersea research which enabled several Gulf of Maine institutions to capture deep submersible research vehicle time from the National Undersea Research Program (NURP). The multi-institution Gulf of Maine undersea research program involving scientists from universities, private laboratories and government is now one of the strong examples of NURP research nationwide.

- In New England and in each region of the United States, there is a strong bond of mutual support amongst Sea Grant Programs. Sea Grant is often the mechanism used to bring institutions together to address issues of marine science and marine resources. The cooperation has existed not only in research but also among our Marine Advisory Programs in the development of regional extension education programs using regionally developed information. On a national basis as well as locally, Sea Grant has learned the value of mutual planning and cooperation. We would welcome the opportunity to aid in the establishment of other mechanisms to ensure a balanced community approach to addressing the important regional marine research needs. We have the experience to help move forward such a process; inexpensively, fairly, and in the context of regional research needs.

Sea Grant institutions around the nation can provide examples of the type I've listed above with respect to Maine and New England. In Alaska I would bring up examples of Sea Grant support and cooperation with the North Pacific Fishery Management Council, the National Marine Fisheries Service and the Alaska Department of Fish and Game, and meetings with the Canadians, Chinese, Soviets, and Japanese in dealing with important North Pacific and Bering

Sea issues. Each program and region could provide its own list. On a nationwide basis Sea Grant has hosted within the past year a national workshop on fishing vessel insurance and related safety issues and another addressing the marine debris issue, a topic not totally unrelated to this bill. With limited resources Sea Grant has had little choice but to search out, discover, or invent mechanisms to enable it to make a dent in its broad mandate of responsibilities. Too many sound research proposals both within our matching fund host institutions and in our partnership institutions still go unfunded. Too many solvable problems still go unaddressed. The funds which would be provided by this bill are badly needed for research programs in each coastal region of the nation. Any mechanism which is established, or borrowed, for allocating these funds to these important research needs must be as efficient as possible in order to ensure the best possible research productivity by the full research community.

PLANNING FOR WISELY FOCUSED RESEARCH AND MONITORING.

Having discussed Sea Grant as a partner, mechanism, and/or example of a program to undertake regional research, let me move on to the role which planning could play in the efficient and wise use of funds for regional research.

Discharge licensing criteria and sharply focused incidents around the nation have often provided the basis for environmental monitoring programs. This monitoring often has little value to researchers trying to understand the environmental systems within which the monitoring is being done. Similarly, research which is undertaken in the same geographic region is not necessarily instructive in dealing with the issues which the monitoring is focused on. This bill could provide a valuable mechanism with which to deal with this important and costly problem. We believe that thoughtful planning involving both academic researchers and state and federal agency personnel would bridge this need.

Without intending to beat the same drum too long nor too hard, we believe that some of the best planning for coastal research has been stimulated by Sea Grant, and that Sea Grant would be a most valuable partner in addressing this issue. The Maine-New Hampshire Sea Grant College Program has focused on the important coastal environmental issues in northern New England through several updates of its rolling Long Range Plan. That on-going planning which already involves a broad advisory process could easily be expanded to address the full Gulf of Maine region. In North Carolina it was Sea Grant that brought together academic and state and federal government scientists from that region to address the research needs of their estuary of national significance. Region by region we believe Sea Grant can provide a tremendously valuable context to the necessary planning which will ensure an effective coastal research program. On a nationwide basis Sea Grant, in identifying national Strategic Research Initiatives, has also undertaken a planning process. We agree with the important timing of this bill. The Sea Grant community has also come to the conclusion that this is a strategic time to undertake a focused program of research on the coastal ocean. Let me share with you some of our own strategic planning in partnership with and in the context of the nation's global ocean science plan.

SEA GRANT COASTAL OCEAN PLANNING

In growing recognition of the ocean's potential benefits and vulnerability to misuse, the U.S. has recently taken several actions of jurisdiction, legislation and research programming. Concern of the public, private industry, and governmental resource management agencies for optimal use of ocean resources, especially in the coastal ocean, is demanding fundamental information on how the system works.

Dearborn Testimony on S.2068

With the growing concern for the coastal ocean it is now abundantly clear that the three-dimensional ocean is closely linked to long-range global changes that will affect us all. It is imperative that we make a national commitment to understand and conserve the oceans on a global scale if we are to safeguard and enhance our national security in terms of our economic vitality and the health of future generations. There is a growing consensus within the marine research community on the nature of the important research priorities for the next twenty years. Two significant reports (1985)* have addressed the essential priorities for future research and recommended action and planning in five primary subject areas:

-Biological Productivity and Living Resources
-Ocean Lithosphere and Mineral Resources
-Pathways and Fates of Materials in the Ocean
-Coastal Ocean and Estuarine Processes
-Global Oceanic and Climatic Processes

The Coastal Ocean and Estuarine Processes initiative closely fits the unique capabilities of the National Sea Grant College Program with its network of universities and multidisciplinary approaches to fundamental research and its effective, creditable network for transferring information and research results to management and business entities.

We are proposing to address Coastal Ocean priorities as a Strategic Research Initiative. Through a consensus of a wide range of scientists and interested parties, we have identified five priorities of critical resource and environmental areas precluded from adequate attention through normal processes and for which unique capabilities have been built through the Sea Grant Colleges and Consortia.

1. Impact of Water Quality on Coastal Ocean Resources - Water quality impacts every individual and every activity involving the U.S. coastal and Great Lake areas. Multidisciplinary approaches are required to understand the fundamental nature of multimedia fates and effects.

2. Fisheries Recruitment Prediction - the fisheries resources of the U.S. are, with few exceptions, products of coastal ocean waters and adjacent estuaries. The ultimate goal of fisheries science is the accurate prediction of the status of species of interest in both the short-term and long-term. This will require integrating fisheries characteristics with physical dynamics and ocean environmental climate.

3. Marine Biotechnology - With new and powerful biotechnology tools we can begin to harness the diverse and virtually unlimited capacity of natural systems to produce goods and services of benefit to man, to solve recalcitrant problems such as plastic debris, more effectively dispose of wastes, and enhance aquaculture production.

4. Sediment and Shoreline Stability - the sediment transport and shoreline stability is the result of complex interactions between the sea bed, waves, currents and sediments. We need an integrated, science-based program to address the key physical, chemical and geological processes affecting sediment transport and shoreline stability, leading to better predictive capabilities.

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* "Emergence of a Unified Ocean Science," a long-range planning document for the NSF Ocean Sciences Program. "Ocean and Marine Resources: Research Priorities and Initiatives," report of the National Association of State Universities and Land Grant Colleges.

5. Coastal Mineral Resources - the Exclusive Economic Zone (EEZ) proclamation focuses the need of developing a comprehensive understanding of the geologic resources, and the environmental, social and economic consequences of their exploitation, within 200 miles of the U.S. coastline.

Mr. Chairman, within the broad context of ocean science, in the context of coastal ocean resource use, and in the context of the important regional marine environmental issues addressed by this bill, our planning within the Sea Grant community has important linkages. You can see how substantially our own coastal ocean priorities overlap with those in this bill. We are very supportive of the objectives outlined in this bill, and look for a partnership role in ensuring its success.

STRUCTURAL CONSIDERATIONS FOR REGIONAL MARINE ENVIRONMENTAL RESEARCH

I have discussed at some length the logic of Sea Grant involvement in the research program outlined by your bill and our desire to be a partner. What I have really talked about, however, is a mechanism to involve the research faculty of our university systems, the largest scientific manpower resource of this country, in dealing with the important marine environmental issues outlined in this bill. Let me suggest some key elements of any federal/regional mechanism we might design to ensure a productive regional marine environmental research program.

- FEDERAL RESEARCH MANAGEMENT. At the federal level we need clarity of objectives, quality control, experience in managing long term extramural research programs, and a neutral context for interagency cooperation and priority setting. Sea Grant can fill that role very well. There are others like the National Science Foundation with whom our universities are already familiar and whom we can work with in a partnership.

- DEFINING REGIONAL RESEARCH PRIORITIES. At the regional level we need a mechanism to identify the most important marine environmental issues, to set those issues in the context of what is do-able scientifically, and to outline the priorities for a goals oriented research program. This scientific long-range plan, which should be reviewed and updated on a regular basis, would become the critical guide against which to judge all research proposals. Such a plan could be well developed only by involving the key scientific and management people in the region. We believe that Sea Grant has far more experience and a far better track record of accomplishments in this area than any other entity region by region around the nation. Given a specific mandate and modest funding Sea Grant would excel at this regional responsibility.

- RESEARCH PROGRAM MANAGEMENT. We need an administrative mechanism which will recruit and select the best scientific project proposals responsive to the regional plan, regardless of whether such proposals might originate from government, private laboratory, or university scientists.

  In order to de-emphasize intraregional competition and to emphasize quality, I strongly recommend against a broad regional council performing the actual proposal culling process. Instead, I would recommend that such a council be strongly involved in the development of the regional plan and have strong oversight responsibility in ensuring that the research projects selected are responsive to the plan. A trim administrative team within an institution containing strong and sophisticated budget management functions, e.g. a university with an active research program, should handle the detailed grants management. My own experience with administering a research and education program

> shared by two universities (the Maine/New Hampshire Sea Grant College Program), whose competitiveness goes far beyond the playing field, has helped clarify my understanding of how such a process works, and at the same time has shown me how productive such multi-institutional relationships can be.

The Sea Grant mechanism is a good one, and I encourage you to use that existing mechanism. The Sea Grant College Program has had a mandate to develop academic institutional capability and to focus that capability on marine resource issues, similar to the way Land Grant College legislation was intended to change the focus of universities years ago. That mandate of the Sea Grant College legislation is not always well understood by our partners external to the university system. However, given a mandate with a regional focus and environmental research emphasis we would have the opportunity to play an even greater partnership role with all scientists in the region. We would welcome that opportunity. If a new structure, rather than using Sea Grant, is deemed to make more sense, then we would look for an opportunity to work in partnership with that entity. Our goals and plans for undertaking research in order to increase our knowledge of how to protect our coastal oceans and to ensure their usefulness and productivity over the long term are mutually shared.

Thank you, Mr. Chairman.

TESTIMONY BEFORE THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

ON

S.2068
A Bill to Amend the Marine Protection, Research, and Sanctuaries Act and proposing

"THE MARINE RESEARCH ACT OF 1988"

BY
ROBIN ALDEN, EDITOR AND PUBLISHER,
COMMERCIAL FISHERIES NEWS
OF STONINGTON, MAINE

April 28, 1988

Thank you, Mr. Chairman, for the opportunity to be here today to testify on behalf of S. 2068, "The Marine Research Act of 1988." I am Robin Alden, publisher and editor of Commercial Fisheries News, the regional trade newspaper for the commercial fishing industry in New England. My company also publishes Commercial Fisheries PRODUCT NEWS which has a circulation throughout the East and Gulf Coasts.

I want to commend Sen. Mitchell for having the vision to recognize the need for a focused marine research program such as that proposed in S. 2068. Those outside the small community of people who make their living from the marine resources of the country are just beginning to realize how little we understand about the ocean. And as we face increasingly obvious threats to the quality of the ocean, particularly in coastal waters, our need to understand the ocean systems becomes clearer every day.

S. 2068 would give the marine research community a mechanism to coordinate, set priorities, and bring concerted intellectual and financial resources to bear on this important topic. The regional and multi-disciplinary approach of the Act is essential to productive oceanographic research and is what sets this Act apart from other research funding initiatives. With the proposed regional research plans in place, this $30 million program could make all of the existing marine research funding far more effective than it is now.

I have been involved in the linkage between the commercial fishing industry and the research community for 15 years now. My contact with the research community has been through the newspaper, during the four years that I spent as part of the Sea Grant Program at the University of Maine and during one term as a member of the New England Fishery Management Council. I am also on the board of Directors of the Bigelow Laboratory for Ocean Science, a private oceanographic laboratory of international repute, located in Boothbay Harbor, Maine.

I will be speaking here today from the perspective of the commercial fishermen and aquaculturists who depend on a clean and productive marine environment for their livelihood. I will try to share with you some of the fishermen's perceptions of both the current health of that environment, the threats which loom, and the status of the current scientific research effort. I also have some comments on the administrative structure set up by the bill.

S. 2068 has broad-based support from the commercial fishing industry in New England. Many of them have spoken in favor of the bill at field hearings previously, and since then a wider group of New England associations have lent their support.

WHY THE COMMERCIAL FISHING INDUSTRY SUPPORTS MARINE RESEARCH

The commercial fishing industry depends for its survival on the quality of the ocean water. And we know so little about the ocean, scientifically, that it is impossible to know what threatens that quality and how. In some areas of the ocean, such as Chesapeake Bay and New York Bight, there is already significant degradation. In other areas such as the Gulf of Maine and Alaska, we still have a chance to study a system prior to serious pollution. In both cases, this is the time to strengthen and expand marine research programs.

Just to give you a sense of the scope of the commercial fisheries: Nationwide, the 1986 commercial fish landings were worth $2.76 billion, not including most aquaculture products. New England's landings in 1986 were $449 million. In 1987, preliminary statistics put them at $512 million. These statistics do not include the four to ten-fold value added, which comes from the shoreside handling of seafood. Furthermore, these landings represented an export value of $1.4 billion in 1986, something that has undoubtedly increased, since the industry has become more successful in penetrating European and Japanese markets.

The fishing industry needs marine research most obviously because research is the only source of information about future supply for the business. Traditionally, most fisheries research has been targeted toward projecting future populations, usually with a goal of effective management of fishing effort. Now, however, ocean pollution has been added to the many factors which affect fish supply and the entire fisheries community has become aware that we need a much finer understanding of the ocean ecosystems in order to make informed business, management and regulatory decisions.

Degradation of the ocean environment threatens the fishing and seafood industry in two ways. The obvious one is that the productivity of the ocean can be ruined, leaving little to catch. Unfortunately, however, the industry feels the harm long before that. Despite this country's excellent public health safeguards, consumers can become worried about fish quality which can destroy the market.

HOW IS THE OCEAN ENVIRONMENT THREATENED?

The pressures that fishermen feel on the East Coast are similar to those affecting fishermen on all our coasts. In discussing specifics, however, I will draw exclusively from my experience with the Northeast. To sum it up, we are feeling beleaguered.

The last few years have presented the fishing industry with such an alarming barrage of threats to the ocean that we started a new, monthly two-page spread in Commercial Fisheries News entitled "State of the Ocean" for coverage of ocean pollution issues. The column is a commitment of space comparable to what we give the New England Regional Fishery Management Council which covers all offshore fishery management for the region.

Here are some of the issues which have come up. There are threats to the physical parameters of the ocean such as:

* The proposed Canadian tidal power project at the head of the Bay of Fundy, which some models say will increase the tidal rise and fall. This would affect current flow, drown estuaries, and flood coastal land.
* Proposed offshore mineral and gravel mining which threatens to alter almost every physical parameter of the ocean from the bottom sediments to the turbidity of the water.

There are threats to the ocean's chemistry from man-made chemicals we discharge in it:

* Trace metals and acids from sewage - both from inadequate treatment plant discharge and from ocean dumping of sewage sludge. Fishermen are turning up evidence that material from new offshore dumpsite in the mid-Atlantic is being swept by ocean currents onto the southern side of Georges Bank, with terrifying potential for damage to the area's productivity.
* Ocean dumping of acidic industrial wastes such as the dumping by DuPont off the mid-Atlantic coast.

* From PCB dumps such as the one in New Bedford Harbor.

* Discharge of tributyltin (TBT) and other toxins from bottom paint on boats.

* Hydrocarbons and drilling mud discharge from offshore oil drilling.

* Increased runoff from development, including agricultural and lawn fertilizers and chemical sprays such as has been used in the Maine woods against the spruce budworm.

And we are seeing an increase in new biological toxins and problems which suggest that the ocean is already stressed:

* An algae bloom called "brown tide" has blossomed in New York's Peconic Bay and believed to be caused by runoff from nitrogen-rich sewage and farmlands. Brown tide has devastated the inshore fisheries and the multi-million dollar shellfisheries in eastern Long Island over the past four years.

* Red tide, the bloom of a dinoflagellate which causes paralytic shellfish poisoning, has become an annual plague to the industry, spreading and changing each year.

* Canada has encountered a new form of shellfish poisoning this winter which appears to be a newly identified form of biological organism producing the toxin.

* After hundreds of bottlenose dolphins washed ashore in Delaware and New Jersey last year scientific speculation is that their weakened immune systems left them vulnerable to a common, naturally occurring bacteria.

* More than a dozen humpback died and washed ashore on Cape Cod over the course of several weeks last December. The fishing and scientific communities were startled when it was discovered that paralytic shellfish poisoning (PSP) concentrated in mackerel livers was the cause of the deaths. Until this incident, PSP had always been associated with shellfish. But the sand lance on which the whales normally feed were just not present this year for unknown reasons and the whales turned to mackerel.

* Bacterial pollution continues to plague most of the coastal waters of the US and the pressures of increased development are only worsening the picture. Bacterial pollution makes millions of dollars worth of resources unharvestable, costs millions of dollars in public health monitoring, and undermines consumer confidence in the product.

CURRENT RESEARCH PROGRAMS

Current marine research programs are underfunded. This causes two problems: first, there are inadequate funds for monitoring, so we don't know what is happening. Second, we know so little about how the ocean system works that we have little ability to interpret the significance of what data we do get.

Much of the National Oceanic and Atmospheric Administration's (NOAA) past research has focused on fishery management, geared to answer the question: "If we do not want to deplete the stocks, how much fish is it safe to allow fishermen to take?" Thus, we have a fisheries assessment program which is quite good for some of the species for which it was designed. It can tell us, with an acceptable margin of error, the size of the next year class of fish coming along. But it cannot tell us why.

We are learning that we must analyze ocean systems in a whole ecosystem approach, looking at the chemistry and physical properties of the ocean, as well as the fish. The other programs which are following this approach do not begin to have the resources to give us the answers we need in a timely fashion.

While this bill proposes only a modest amount of funding, its bio-geographic regional priority setting will help make all of the ocean research more effective.

Is this bill duplicative? No, the research it funds should not duplicative due to the regional planning process. This is important. The Administration must not interpret this as a substitute for existing funding to such agencies as NOAA and EPA.

The bill is not duplicative in structure, either. There is currently no regional structure available. The states, Sea Grant programs and private labs and universities have no regional group that catalyzes scientific focus and collaboration on ecosystems as this bill does. This has been demonstrated with the experience of the Associated Research Group of the Gulf of Maine.

Allowing for the establishment of an open regional group which allows all participating institutions in on an equal footing is key to the success of the research proposed by this bill. While Sea Grant has done an excellent job in pulling together diverse groups for effective research on a state basis, there is no regional Sea Grant structure which this bill would duplicate.

REGIONAL APPROACH IS EXCELLENT

The regional, multi-disciplinary approach of this Act is the correct approach. These bio-geographic regions are the appropriate scale for setting priorities for ocean study. Local priorities are too narrow and nationwide priorities would enable some sub-systems of the ocean to fall through the cracks with ecological consequences we cannot predict.

The bill allows for setting priorities at a level where people are familiar with the facts and conditions. This is consistent with an old writer's adage: "Write what you know" which is equally applicable to the development of research plans at a regional level by people familiar with the region. Concentrating on local/regional ecosystems should speed the pace of learning about these complex systems.

REGIONAL CENTERS WILL BENEFIT PUBLIC INFORMATION

There is great value in the regional centers serving as a source of responsible information to the press about ocean issues particularly the health consequences of events. There is also benefit to more public education about marine issues, in order to build an understanding about and responsibility for the oceans.

WILL THE VIEWS OF THE FISHING INDUSTRY BE CONSIDERED?

Sen. Mitchell asked me specifically to comment to this point. Unfortunately, it is always very difficult for fishermen to have their interests adequately represented in the formation of research plans. Schedule problems, differing perspectives and languages divide fishermen and researchers. By naming the commercial fishing industry specifically as a member of the regional Research Advisory Groups, I feel the bill goes as far as is practical in insuring cooperation.

Fishermen are a tremendous source of anecdotal knowledge about the ocean, and they are the front line of observers. My hope is that the regional priority-setting process will create those situations where individual fishermen with an interest in research, and researchers with a respect for fishermen's knowledge will have a chance to exchange ideas. That, I believe, is the most we can hope for.

RESEARCH COORDINATION AND OVERSIGHT

I am wary of centrally-directed research programs. Academics are a bit like fishermen - they are independent. They do not like to be told what they will study, and when. But like fishermen, they are opportunistic as well, and both groups go where the money is.

As far as I am concerned, the most effective research coordination is that fostered by exchange rather than fiat. Therefore, the process of plan setting under this Act should be one which gets investigators together to exchange ideas and pound out priorities, rather than something done by a bureaucracy and imposed. Once the plan is set, the revising should be ongoing, coming out of regular meetings for scientific exchange.

After years of watching the national/regional push-pull which occurs over Saltonstall/Kennedy monies and under the Fishery Conservation and Management Act I want to state for the record that the role of the Marine Research Coordination Board should be that of the minimum federal oversight. If the regional centers have set their priorities through an appropriate process, once set, they should not be second-guessed by the national group.

GLOBAL ISSUE

In closing, I want to add that the health of the oceans goes far beyond the health of several industries. It is a global issue, the concern for life on earth itself. The oceans are the start of the food chain for the planet, our largest producer of oxygen, and a major contributor to our climactic conditions. Forces such as acidification from ocean dumping or increased ultraviolet radiation due to depletion of the ozone layer, can completely change or destroy the tiny organisms which we depend on.

Knowledge is the essential first step toward protecting this source of life. This Act is a small but practical and significant step toward understanding the ocean at its most basic level.

Thank you, Mr. Chairman.

ENVIRONMENTAL POLICY INSTITUTE

STATEMENT OF CHARLES FOX
DIRECTOR, COASTAL PROTECTION PROJECT
ENVIRONMENTAL POLICY INSTITUTE

ON BEHALF OF

AMERICAN OCEANS CAMPAIGN
CHESAPEAKE BAY FOUNDATION
CLEAN WATER ACTION
COALITION FOR THE BIGHT
CONNECTICUT FUND FOR THE ENVIRONMENT
CONSERVATION LAW FOUNDATION OF NEW ENGLAND
COMMITTEE TO PRESERVE ASSATEAGUE ISLAND
ENVIRONMENTAL POLICY INSTITUTE
FRIENDS OF THE EARTH
GROUP FOR THE SOUTH FORK
IZAAK WALTON LEAGUE OF AMERICA
NATIONAL AUDUBON SOCIETY
NATIONAL WILDLIFE FEDERATION
NATURAL RESOURCES DEFENSE COUNCIL
NORTH CAROLINA COASTAL FEDERATION
PUGET SOUND ALLIANCE
SAVE THE BAY
WESTPORT RIVER WATERSHED ALLIANCE

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ON

S. 2068, THE MARINE RESEARCH ACT OF 1988

APRIL 28, 1988

218 D Street, S.E., Washington, D.C. 20003 (202) 544-2600

Mr. Chairman and Members of the Subcommittee:

My name is Charles Fox and I am the Director of the Coastal Protection Project for the Environmental Policy Institute (EPI). EPI is a national, nonprofit organization engaged in environmental research, education, litigation and advocacy. We greatly appreciate your invitation to appear here this morning to share our views on S. 2068, the Marine Research Act of 1988.

Our statement this morning is made on behalf of American Oceans Campaign, Chesapeake Bay Foundation, Clean Water Action, Coalition for the Bight, Connecticut Fund for the Environment, Conservation Law Foundation of New England, Committee to Preserve Assateague Island, Environmental Policy Institute, Friends of the Earth, Group for the South Fork, Izaak Walton League of America, National Audubon Society, National Wildlife Federation, Natural Resources Defense Council, North Carolina Coastal Federation, Puget Sound Alliance, Save the Bay, and Westport River Watershed Alliance.

I. INTRODUCTION AND SUMMARY

We would like to commend Subcommittee Chairman George Mitchell and other cosponsors of the legislation for this timely and important effort to improve our knowledge of coastal ecosystems in order to improve long-range management. We believe that the proposed legislation would complement and substantially strengthen existing coastal research and monitoring programs of federal and state governments. Current programs, unfortunately, do not adequately address the pressing, ecosystem-wide informational needs of resource managers at all levels of government. Moreover, existing research and monitoring programs have been plagued with inadequate funding.

The legislation proposes the establishment of regional research and monitoring centers throughout the nation. These centers would coordinate and direct research and monitoring activities of federal and state agencies as well as private and public research institutions. Importantly, the legislation focuses research and monitoring activities on assessments of ecosystem-wide trends, including cumulative impacts of pollution loads and habitat losses. National coordination needs among the various regional centers would be served by the proposed Marine Research Coordination Board.

A major strength of this proposed legislation is its regional, ecosystem-based approach to coastal research and monitoring. Too often, research and monitoring programs are not directed toward addressing basic questions on the cumulative effects of pollution loads, habitat losses, and resource declines. The regretable result is that federal, state and local decision-makers often do not have access to essential information necessary to evaluate proposed activities and various management options.

The bill also includes important provisions to coordinate the myriad of coastal research and monitoring functions performed by literally hundreds of government agencies and institutions across America. As part of this coordination, the legislation proposes to involve *directly* federal and state regulatory agencies in the development and interpretation of long-range research and monitoring programs. This integration and involvement is essential to the development of successful management strategies.

Our testimony this morning is summarized as follows:

1. Existing ecosystem-wide coastal problems will demand ecosystem-wide responses from federal, state and local governments. Research and monitoring programs must be structured to support these management needs.
2. Existing research and monitoring programs have not adequately provided essential, ecosystem-wide information to decision-makers and the general public. Funding levels for coastal research and monitoring programs have been inadequate.
3. The legislation's proposed regional centers would greatly enhance long-term coastal management by focusing research and monitoring toward the priority information needs of decision-makers. The legislation offers an appropriate and effective federal role in providing technical and financial assistance to the regional centers.
4. The legislation's mechanisms for coordination and *direct* involvement of federal and state regulatory agencies will significantly improve the development and interpretation of research and monitoring programs. This involvement will promote comprehensive management strategies.

Our testimony concludes with a number of recommendations which would strengthen the proposed legislation. Most importantly, we believe that its authorized funding levels must be increased substantially and that a long-term, *secure* source of funds must be established. In addition, the legislation should strengthen its mandate to the regional centers to assure that sufficient attention is devoted to coastal monitoring and crucial management and informational needs. Finally, we believe that the legislation should clarify and distinguish its relationship to existing regional research and monitoring efforts such as those in Puget Sound, San Francisco Bay and Chesapeake Bay.

II. ECOSYSTEM-WIDE NEEDS

> Existing ecosystem-wide coastal problems will demand ecosystem-wide responses from federal, state and local governments. Research and monitoring programs must be structured to support these management needs.

In recent years, a growing body of evidence has emerged which suggests that our nation is facing a coastal crisis. Cumulatively, habitat loss, toxic contamination, nutrient enrichment, and pathogen contamination threaten both public health and ecosystem health from coast to coast.

Excessive nutrient pollution, for example, has fueled the growth of algae and led to dramatic losses in dissolved oxygen in many coastal waters throughout the country. In 1985 and 1986, a 3,000 to 4,000 square mile area in the Gulf of Mexico experienced low dissolved oxygen, most likely the result of an apparent two-fold increase in nutrient pollution from the Mississippi River in the past decade.[1] Similar so-called anoxic events have been documented in Chesapeake Bay, Long Island Sound and large portions of the coastal waters off New York and New Jersey. The U.S. Environmental Protection Agency has concluded that virtually all coastal waters adjacent to major urban areas may be threatened by such eutrophication.[2]

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[1] *Wastes in the Marine Environment*, Office of Technology Assessment, U.S. Congress, Washington, D.C., April, 1987.

In addition, toxic contamination of coastal waters, sediments and biota pose significant threats to public health and the coastal environment. Throughout the country, toxic contaminants have been linked to acute and chronic effects on finfish and shellfish, particularly bottom-dwelling species near urban areas. Tumors, cancerous lesions, skeletal anomalies, shell disease, ulcers and fin rot have been found frequently in highly contaminated portions of Boston Harbor, San Francisco Bay, Puget Sound, Santa Monica Bay, New York-New Jersey Harbor and Chesapeake Bay.[3]

Cumulatively, habitat losses and over-development also have had substantial adverse impacts on coastal ecosystems. In San Francisco Bay, for example, over 90 percent of coastal wetlands have been destroyed. Nationwide, over 50 percent of coastal wetlands have been lost to development in the last century.[4] Furthermore, resource projections indicate that continued population pressures will exacerbate existing habitat problems in the future.

Effective resolution of these and other threats to coastal ecosystems will demand multifaceted actions from all levels of government. A recent, unprecedented citizens conference hosted by Save the Bay of Rhode Island resulted in the development of a comprehensive national agenda to protect and restore our nation's coastal ecosystems.[5] The week-long conference, which involved representatives from 65 organizations throughout the country, culminated with a series of detailed recommendations to control water pollution and protect sensitive coastal lands.

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[2] *Near Coastal Waters Strategic Options Paper*, U.S. Environmental Protection Agency, Office of Marine and Estuarine Protection, Washington, D.C., August, 1986.

[3] *Wastes.*

[4] *Near Coastal Waters.*

The national agenda stresses the need for management actions on a diverse array of problems which threaten coastal environments. Such problems include, but are not limited to:

- agricultural practices which destroy wetlands and contribute excessive nutrients, sediments and pesticides to coastal waters;
- poorly treated sewage and industrial discharges which contribute a range of toxic contaminants, pathogens and nutrients to coastal waters and sediments;
- existing toxic "hot spots" which threaten living resources and export contaminants to other coastal areas; and,
- uncontrolled growth and the loss of sensitive habitats which degrade water quality and adversely impact living resources.

Comprehensive research and monitoring programs are essential to meeting these management challenges. While priority problems and specific management needs may vary from region to region, *all* regions must successfully identify, evaluate and respond to major ecosystem threats. Increasingly, decision-makers look to research and monitoring programs to predict ecosystem responses to proposed activities and various management options.

Decision-makers' needs range from the specific effects of a single toxic compound on a single species to more complex questions about the cumulative effects of various habitat modifications. To meet these and other needs, research and monitoring programs must be well structured and adequately funded, including clear statements of ecosystem-wide goals and objectives. However, as we will spotlight, existing research and monitoring programs have not adequately addressed the information needs of decision-makers and the general public.

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[5] *Saving Our Bays, Sounds, and the Great Lakes: The National Agenda*, Save the Bay, Inc., Providence, Rhode Island, April, 1988.

III. LACK OF ESSENTIAL, ECOSYSTEM-WIDE INFORMATION

> **Existing research and monitoring programs have not adequately provided essential, ecosystem-wide information to coastal decision-makers and the general public. Funding levels for coastal research and monitoring programs have been inadequate.**

By way of definition, in general, coastal monitoring programs seek to observe and describe coastal ecosystems including pollution loads, water and sediment quality, habitat, and living resources. Long-range monitoring programs can quantify ecosystem trends, such as changes in water quality parameters or habitat types. Coastal research programs, on the other hand, are more interpretive in nature. Research programs seek to evaluate ecosystem processes including, for example, the transport, fate and effects of contaminants in coastal environments. In practice, the distinctions between monitoring and research often are blurred. Programmatically, coastal monitoring and research must be integrated with complementary goals to meet the information needs of decision-makers.

Coastal research and monitoring is performed by literally hundreds of government agencies and institutions under mandates of dozens of statutes and programs at all levels of government. At the federal level, at least nine major agencies and departments,[6] operating under at least 13 major statutes,[7] are involved in some important aspect of coastal ecosystem research and monitoring.

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[6] Including, the National Oceanic and Atmospheric

Management and coordination needs are truly immense. And not surprisingly, this issue has been the focus of much attention over the years. Numerous interagency workshops, agreements, and memoranda of understanding have been devoted to improving coordination among federal and state agencies, public and private research institutions, and decision-makers. On balance, great progress can been seen in this area over recent years.

However, for coastal decision-makers at federal and state levels, this attention has not produced essential information for ecosystem management. Fundamentally, very few research and monitoring programs are organized to provide comprehensive ecosystem-wide information to decision-makers.[8] Such information needs include ecosystem-wide data on:

- cumulative pollution loads, sources and effects;
- land use and habitat changes and sources, and effects on water quality and living resources; and,

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Administration, the Environmental Protection Agency, the Geologic Survey, the Fish & Wildlife Service, the Army Corps of Engineers, the Coast Guard, the National Aeronautics and Space Administration and numerous agencies within the Departments of Agriculture and Defense.

[7] Including, the Marine Protection, Research and Sanctuaries Act; the Clean Water Act; the National Ocean Pollution Policy Act; the National Sea Grant College Act; the Magnuson Fishery Conservation Act; the Anadromous Fish Conservation Act; the Food, Drug, and Cosmetic Act; the Endangered Species Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Food Security Act; the Coastal Zone Management Act; the Fungicide, Insecticide and Rodenticide Act; and, the Toxic Substances Control Act.

[8] Important exceptions include programs recently established by NOAA's Oceans Assessment Division and a handful of regional efforts such as Chesapeake Bay, Puget Sound and San Francisco Bay. However, these programs have limitations as well, some of which are identified later in this statement.

* living resource population changes, including causes and effects.

Grossly inadequate funding levels are certainly a major factor in this absence of essential ecosystem-wide information. However, research and monitoring programs commonly lack clear statements of ecosystem-wide goals and objectives. Moreover, regulatory agencies and other coastal decision-makers are rarely involved in guiding the development and interpretation of comprehensive coastal research and monitoring programs. In addition, vitally important information synthesis and dissemination needs are not being met through existing programs.

A more specific discussion of the needs for existing coastal monitoring and research programs is appropriate at this juncture. Monitoring programs, in particular, must be substantially redirected and enhanced if we are to successfully provide the information base necessary for decision-making.

Coastal Monitoring Needs

At the most basic level, coastal monitoring programs often do not address *major* sources of pollution to coastal waters. For example, specific data regarding pollution loads from agricultural runoff, combined sewer overflows, storm drains, oil and gas operations, contaminated sediments or the atmosphere commonly are unavailable. The result, obviously, is that local coastal managers are unable to evaluate the nature and extent of these sources in any specific manner.

Historically, coastal monitoring programs have been directed

toward geographically-narrow, so-called "compliance" monitoring of specific discharges. Only recently have greater attention and resources been devoted to broader, ecosystem-wide ambient monitoring of coastal waters and sediments. However, the scope and extent of water and sediment quality monitoring in coastal areas remain *extremely* limited.

Similarly, living resources monitoring has focused narrowly on higher trophic levels such as commercially important finfish and shellfish. Comprehensive data rarely are maintained on vitally important ecosystem communities such as phytoplankton or submerged aquatic vegetation.

The U.S. Environmental Protection Agency recently completed an assessment of surface water monitoring which bluntly concluded: "The present approach to surface water monitoring cannot fully provide the information that managers increasingly need."[9] The report also revealed that most states actually have *reduced* their number of regularly-sampled fixed stations over the past few years in response to the rising cost of data collection and analysis and the growing need for monitoring in support of point source control decisions.

Of equal concern, coastal monitoring programs generally devote too little attention and resources to the analysis, synthesis and interpretation of existing monitoring data. In the long-term, this is inefficient and costly. Not only are existing data not used by decision-makers, but it also prevents

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[9] *Surface Water Monitoring: A Framework for Change*, U.S. Environmental Protection Agency, Office of Water, Office of Policy, Planning and Evaluation, Washington, D.C., September, 1987.

refinements in ongoing monitoring programs and may mask emerging long-term trends. Ideally, significant resources should be devoted to the synthesis and communication of data, in various forms, to decision-makers and the general public.

Coastal Research Needs

Numerous ongoing processes of federal and, to a lesser extent, state governments seek to identify priority research needs for coastal ecosystems. Not surprisingly, these needs are tremendous. Both the National Oceanic and Atmospheric Administration[10] and the U.S. Environmental Protection Agency[11] recently completed evaluations of priority research needs for coastal ecosystems.

Research on coastal contaminants and habitat modifications appear to top the agenda. Pressing needs on contaminants research include a better understanding of the transport, fate and effects of toxics, pathogens and nutrients in the coastal environment. Beyond these general needs are a *host* of specific research questions which can range from the role of sediments in ecosystem nutrient cycling to the synergistic effects of toxic contaminants on important coastal populations.

Similarly, habitat research needs range from the effects of changes in freshwater flows into estuaries to the relationships between terrestrial habitats and aquatic populations. Other priority research needs include living resources and population dynamics, as well as public health threats from contaminated seafood.

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[10] *NOAA Estuarine and Coastal Ocean Science Framework*, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Estuarine Programs Office, Washington, D.C., October, 1987.

[11] *Technical Information and Research Needs to Support a National Estuarine Research Strategy*, U.S. Environmental Protection Agency, Office of Water, Washington, D.C., January, 1986.

There are numerous pollution control research needs not commonly identified by coastal researchers. For example, so-called "best management practices" which are promoted to control agricultural nonpoint source pollution are not always "best" from a water quality or habitat protection standpoint. The U.S. Department of Agriculture recently identified a number of priority research needs to protect water quality.[12]

Coastal policy research needs are also significant. Complex federal and state tax policies, for example, have an important (but specifically unknown) effect on coastal development, whether urban, suburban or agricultural in nature. Research needs also include innovative state and local government programs and policies to protect sensitive lands, control diffuse sources of pollution, and provide funding for environmental programs.

IV. FEDERAL LEADERSHIP

The proposed regional centers would greatly enhance long-term coastal management by focusing research and monitoring toward the priority informational needs of decision-makers. The legislation offers an appropriate federal role in providing technical and financial assistance to state governments.

As we have described, existing research and monitoring programs have not adequately provided essential information to coastal decision-makers and the general public. In many ways, this has stymied effective management actions on a range of threats to coastal environments.

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[12] *1987 Soil and Water Conservation Research and Education Progress and Needs*, U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C., June, 1987.

The proposed legislation seeks to remedy this situation by establishing regional research and monitoring centers to collect and disseminate essential information about major threats to coastal ecosystems.

Under the legislation, regional centers would be charged with the task of developing long-range research and monitoring programs to evaluate *specifically* ecosystem-wide problems such as water and sediment quality degradation, habitat modifications, and living resource declines. Necessarily, this will require specific examination and evaluation of major threats to coastal ecosystems. Ultimately, this will lay the groundwork for comprehensive management actions.

The regional, ecosystem approach offers many benefits. Fundamentally, it acknowledges the site-specific data requirements of federal, state and local decision-makers and forces a necessary evaluation of cumulative impacts to coastal ecosystems. It will lead to the establishment of comprehensive information systems for decision-makers and the general public.

The regional approach also allows important flexibility to focus attention and resources at priority problems which vary significantly throughout the country. It assures a certain equity in the distribution of resources toward more narrow, regional-specific threats to coastal environments.

It should be mentioned that the overall goals and regional foci of the legislation in many ways parallel recent draft program proposals of the National Oceanic and Atmospheric Administration.[13] These draft proposals acknowledge both major gaps in existing information and the need to organize research and monitoring programs on an ecosystem basis.

The proposed regional centers and national coordination board also would provide significant benefits to the federal government. The legislation would greatly enhance national information on coastal resources and environmental threats. It would provide an improved basis for assessing priority national problems and responding, where appropriate, with administrative and/or legislative remedies.

In addition, the proposed legislation retains the broader federal interest in the ongoing activities of the regional centers by mandating that the national coordination board approve certain plans. This important mechanism ultimately may assure that regional research and monitoring strategies are directed toward priority management needs.

V. COMPREHENSIVE MANAGEMENT STRATEGIES

> The mechanisms for coordination and *direct* involvement of federal and state regulatory agencies proposed in the legislation will significantly improve the development and interpretation of research and monitoring programs. This involvement will promote comprehensive management strategies.

The proposed legislation would mandate state and federal agency participation in the development of the research and monitoring programs of the regional centers. The primary benefits of this approach are two-fold: 1) the specific needs of decision-makers will be reflected in program development; and, 2) the decision-makers themselves will be involved in interpreting the results. This latter point is particularly important with respect to the subsequent development of management strategies to address ecosystem needs.

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[13] See *Draft Ecosystems Monitoring and Fisheries Management, Program Development Plan*, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, September, 1987, and *Information for Decisionmaking, NOAA Coastal Ocean Initiative*, National Oceanic and Atmospheric Administration, National Ocean Service, March, 1988.

It can be argued, for example, that the Chesapeake Bay "success story" was a function of the direct involvement of the federal government and three states' agencies in the comprehensive study which identified the priority ecosystem threats. In effect, the study's *process* achieved consensus among the many regulatory agencies on specific management needs. Subsequent political leadership by Governor Harry Hughes and others produced the results. Today, this approach is integral to the Environmental Protection Agency's National Estuary Program.

The proposed Research Advisory Groups and public reporting requirements provide additional benefits for the legislation. The Research Advisory Groups, with their broad-based composition of public interests, would serve in an important oversight capacity to the regional centers. In addition, the legislation's mandate that public assessment reports be drafted in non-technical style will help to involve interested citizens.

VI. RECOMMENDED MODIFICATIONS TO THE LEGISLATION

Finally, we would like to discuss three recommendations which would strengthen the proposed legislation. If the Subcommittee desires, we would be happy to submit specific legislative language at a later date.

Most importantly, we believe that the authorized funding levels must be increased significantly, particularly for future fiscal years after an appropriate period for program start-up. In addition, it is essential that a long-term, *secure* source of funding be provided.

Existing research and monitoring needs throughout the country are truly immense and $3,000,000 per year for each regional center will in no way meet America's critical needs. The costs of an adequate monitoring program alone for each region probably would exceed that sum. Additional needs for research, information synthesis and communications would be substantial.

Furthermore, the need for a long-term *secure* source of funds is crucial. One need only look at the recent funding history of the new Clean Water Act programs to realize that sufficient appropriations for a new program such as this may not be forthcoming. Absent a dedicated source of funds, this new program may siphon money from valuable existing coastal programs. In our view, this would be completely unacceptable.

The legislation also would benefit from a more direct mandate that research and monitoring programs are to support ecosystem-wide management needs, including a specific charge that comprehensive monitoring programs must be established. We believe that the legislation should provide more strict criteria to the regional centers to assure adequate attention is devoted to critical issues such as cumulative pollution loads, habitat losses and adequate fresh water inflow. Furthermore, the information synthesis and dissemination roles of the regional centers should be enhanced.

Finally, we believe that the legislation must clarify its relationship to existing regional research and monitoring programs such as those in Chesapeake Bay, Puget Sound and San Francisco Bay. Despite their "higher profiles," these areas have significant research and monitoring needs as well. We would encourage the Subcommittee to solicit input on this issue from citizens groups and federal and state officials in these and other important regions.

In conclusion, the ultimate success of this program will be dependent significantly on the active involvement and support of often-disparate federal and state agencies and citizen groups throughout the country. Substantial leadership on the part of this Subcommittee and other Members of Congress will be required to meet this challenge. Given pressing national needs, it is our sincere hope that this will occur in a timely fashion.

Thank you for the opportunity to offer our views on the proposed legislation.

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STATEMENT OF JAMES P. KENNETT

DIRECTOR, MARINE SCIENCE INSTITUTE,
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ON THE MARINE RESEARCH ACT OF 1987, S. 2068

BEFORE THE SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION
OF
THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE
APRIL 28, 1988

STATEMENT OF JAMES P. KENNETT ON THE MARINE RESEARCH ACT OF 1987

Status of Marine Research Programs and Activities?

A number of important aspects of the United States marine science effort in the coastal regions would be strengthened by the Marine Science Research Act of 1987:

1. Funding levels have been drastically decreasing at a time when pressures on the marine environment have been mounting, especially in the coastal regions. Anthropogenic activity is creating increasingly significant environmental impacts on time scales of only one generation, when in the past such changes occurred over geological time scales. By providing **new funds** this bill will help to reverse the erosion of the U.S. marine science research enterprise especially with respect to the coastal regions.

2. Insufficient attention has been given to **basic research** in studies of the marine coastal realm. Applied problems require a strong foundation of basic research and often set the agenda for basic research.

3. **University** scientists have been inadequately used for environmental research in the coastal regions, given the strong tradition within the university setting for basic research and objectivity.

4. Interdisciplinary marine science programs need to be strengthened. The ocean acts as an integrated system and its understanding requires an **interdisciplinary approach**. The analysis and solution of environmental problems often requires application and understanding of several disciplines in the physical, chemical and biological systems such as physical oceanography, several types of marine biology, marine chemistry, toxicology and marine geology. Development and evaluation also require contributions from engineering, law, economics and public policy. Important research endeavors fall within the cracks between disciplines, institutes and departments and the various funding agencies. In general, the existing structure is not optimal for the support of interdisciplinary programs in the coastal regime. As a result many existing marine science groups need reinforcement towards developing a strong interdisciplinary basis.

5. There has been insufficient attention towards the integrated analysis of marine systems over **broad regions**. This has retarded progress towards an understanding of fundamental and unifying processes that characterize particular coastal marine regions. The possible affects of anthropogenic activities are best understood within a framework of thorough understanding of natural environmental and biotic systems.

6. Existing marine science groups often do not possess **sufficient breadth and depth** of expertise to respond adequately to national and regional needs in the coastal areas. This deficiency is especially important in times of emergency. In some ways this contrasts with the current situation in blue-water oceanography.

7. Interdisciplinary hiatuses exist between marine science and the broad spectra of more traditional disciplines, e.g. marine and terrestrial geology. Greater integration would strengthen the marine science effort.

8. Marine science is not adequately interfaced with **environmental policy issues**. The discoveries from science need more effective translation to the public sector and to national and state policy.

Is it Necessary and Appropriate to Expand and Strengthen Marine Reseach Programs?

This issue should be of high priority within the federal government. Major population increases in the coastal regions during the next two decades will continue to create negative impacts on the coastal environment. This is especially true of Southern California. Pressures will also continue to increase in relation to marine resource utilization, a growing national problem, in part related to the major growth increases occurring in global population and international trade. Environmental events continue to occur in marine coastal regions that are poorly understood because of insufficient understanding of marine environmental systems, including the El Nino phenomena that has profound effects upon fisheries and other marine resources. Solutions to applied problems are required using marine science in its broadest interdisciplinary sense. The universities and research institutions require strengthening to assist with current and future problems. Research groups are not sufficiently established to deal with many problems, nor are appropriate funding mechanisms in place.

Advantages and Disadvantages of Regional Approach to Marine Coastal Research?

Conceptually there are several important advantages in establishing regional centers for conducting research in the coastal areas. Regional centers will provide a stronger basis for more coordinated, interdisciplinary studies of the marine environment. Each region is marked by different marine parameters and environmental problems that require a particular range of scientific expertise. For instance, the northern part of the Californian Bight environmental problems are related to the multiple uses of hydrocarbon development, fisheries, marine transportation, tourism and recreation. The regional coastal marine environments remain remarkably poorly understood and yet they are of enormous economic importance. Unlike some nations, the United States has never attempted, until now, to organize centers for the study of regional marine science and problems. The current funding structure encourages a more fragmented approach to marine science research. Regional analyses have often been neglected by research institutions and the federal agencies because either they have not seen this as their primary role or they have not possessed sufficent flexibility for the funding of such programs. Coordinated regional programs would help alleviate this situation. However, it is important that investigators not associated with such centers continue to have access to research funds from other sources.

Regional centers will encourage the sharing of vessels and major facilities on a regional basis and provide a stronger foundation for the integration of available personel. Groups will become established with the necessary expertise to advise on cases of environmental emergencies and to provide a strong technical base to advise about environmental problems and to assist with multiple-use conflicts.

To be most effective, the regional centers need to be established with certain characteristics in mind: they need to be conceptually broad to study the marine environment and biota within the broadest possible framework, the centers should not be established to study specific problems or they will become outdated. Each center should itself establish the priority of problems and have sufficient flexibility and freedom in research directions. Program flexibility will assist in attracting scientists of high caliber to the programs. Each center should be closely associated with an academic institution in order to strengthen needed linkages between applied and basic research. Periodic peer review will be essential for quality control and to enhance productivity.

Advantages of Long-Range and Multidisciplinary Research?

The importance of multidisciplinary research has been emphasised above. It is essential to understand as much as possible about complete coastal marine systems. Major initiatives are developing within several federal agencies for studies of earth system science - a fully integrated approach to the study of the global environment. The development of regional centers will provide an important opportunity for broad regional analyses of the coastal environments that can, in turn, be integrated within the developing data base of global environmental systems. The centers concept could be viewed as an opportunity dedicated to a **Decade of the Coastal Ocean.**

The long-term funding approach has major advantages for both scientific and logistic reasons. Anthropogenic effects upon the marine environment should be examined within the broader framework of natural environmental perturbations. Long-term studies will allow time-series measurements of natural changes within the marine environment. These can be very large, such as the El Nino/Southern Oscillation phenomena.

From a logistic standpoint, long-term funding will assist with the attraction and retention within the programs of a necessary body of talented scientists. It will also assist in stabilizing the current highly unstable climate of funding. Many young marine scientists are funded under short-term programs. Time is needed for the development of necessary expertise and breadth for each multidisciplinary research group. Once established, the groups would represent powerful advisory bodies that should remain relatively intact.

The Need for Public Information and Policy?

The scientific and management problems associated with accelerated environmental change require increased public awareness and understanding. The centers could assist in developing public awareness and understanding of marine environmental problems, together with policy implications surrounding these problems and options of sound management of natural resources. Compared with the past, the public have become increasingly concerned about environmental issues and seek objective information. To be most effective, scientists must increase their ability to communicate their findings to those who can implement policies and programs that incorporate scientific information efficiently. Effective and sensible policy responses are predicated on good communication among scientists and policy makers. The regional centers will assist with this communication and education with the public and policy makers. If adequately funded, the centers could also serve as providing an impartial body of quality information to decision makers and ultimately decrease the spending of considerable public funds for ineffective environmental studies, such as many environmental impact reports.

Effective Coordination Amongst Different Agencies?

It is important that effective scientific coordination occur between each center and the federal agencies and various institutions working within each region. Each center should have an office established to coordinate between the different agencies and groups. Each federal agency should identify an individuai who coordinates with the center. This communication and coordination would become especially critical during environmental emergencies.

Suggestions for Improvement of Legislation?

The bill currently has no educational component and would be strengthened with an identified provision for graduate fellowships to train students through research programs. An important need exists for the multidisciplinary education of marine scientists and policy makers to produce the leaders of the future. Quality graduate students are often the most productive members of scientific groups.

A further suggestion relates to the location of the boundary between the west coast regions. For scientific, logistic and economically-related reasons, it is suggested that the northern boundary of the Southern Californian Bight region be moved from Point Conception to Point Buchan (adjacent to San Luis Obispo and Morro Bay). This would bring the Santa Maria Basin into the southern region. The scientific and resource-related problems are similar between the Santa Maria Basin and the Santa Barbara Basin immediately to the south. Both basins produce large quantities of hydrocarbons and have large known oil reserves. Although a biogeographic boundary is located near Point Conception-Point Arguello, this boundary is itself gradational and is affected by California Current gyres and upwelling phenomena common to the region as a whole rather to a precise boundary located at Point Conception.

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Subcommittee on Environmental Protection,
Committee on Environment and Public Works,
United States Senate

April 28, 1988

Revised and Edited, May 9, 1988

MR. CHAIRMAN: Thank you and your subcommittee for the opportunity to present testimony on the legislation; "To amend the Marine Protection Research and Sanctuaries Act to protect marine and nearshore coastal waters through establishment of regional marine research centers." S.2068.100th Congress 2D Session. I have benefitted greatly in preparing this testimony from conversations with colleagues of the Environmental Sciences Program, University of Massachusetts-Boston and of the Woods Hole Oceanographic Institution. My statement is that of an individual researcher and educator and it is not an official position statement of either organization.

I began my career as a marine scientist during Ph.D. studies in oceanography at the Graduate School of Oceanography at the University of Rhode Island. My doctoral dissertation, completed in the summer of 1971, focused primarily on chronic pollution, mostly oil pollution problems in Narragansett Bay, Rhode Island. After a year of Postdoctoral study at the Woods Hole Oceanographic Institution, I was appointed to the scientific staff of the Institution and during the period of 1982-1987, I was Director of the Institution's Coastal Research Center. In February of this year, I moved to my present position at the University of Massachusetts-Boston. During the past eighteen years I have had the good fortune to conduct research in several locations around the world in both deep ocean and continental shelf-nearshore estuarine areas. At least one-half of my research has focused on marine environmental quality issues and many of the study sites have been in United States nearshore and estuarine areas. Funding for this research has been provided at various times by several agencies including the National Science Foundation, the Office of Naval Research, Sea Grant and other branches of the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency, the Department of Energy, the Bureau of Land Management Environmental Studies Program of the OCS areas (now the Minerals Management Service ESP Program), Department of the Interior, UNESCO and UNEP, and several private foundations.

I have been involved at the interface between scientific research and policy and management issues in the marine environmental quality arena for international, national, state and local government agencies and organizations, and U.S. National Research Council Boards and Committees.

The preceding is a synopsis of the experience that forms the basis for comments on the legislation and issues being considered by this subcommittee. My statement is guided by the general questions set forth in your letter of invitation of April 14, 1988.

General Status of Marine Research Programs and Activities.

Marine research programs and activities span a wide range of types, topics, federal agency missions, and degree of effectiveness and success. S.2068 mentions two of these efforts, the National Sea Grant Program and EPA's National Estuaries Program (also referred to as the "Bays Program"). The Sea Grant Program has been the subject in recent years of "budget ping-pong" between the Executive Branch and Legislative Branch of the Federal Government. This has a debilitating influence on long range research programs and has deterred several very capable scientists from submitting proposals to undertake critically important research. Furthermore, there are a few disturbing instances when research of reasonably high quality, as judged by peer review and seemingly appropriate to stated Sea Grant missions and priorities, is not funded because of overt or covert political sensitivities and pressures. It is also disturbing that Sea Grant funding practices in many parts of the country effectively exclude most research scientists not resident at a Sea Grant university or institution. This is a result of budget controls exercised by Sea Grant Directors at these institutions accompanied by subtle and not so subtle pressures to fund colleagues at these institutions coupled with severe budget constraints imposed at the national level. Of course, a precept of Sea Grant universities and institutions was the existence of a critical mass of excellent research scientists, educators and outreach specialists in one location. Despite these types of drawbacks, the Sea Grant Program has been a success; especially in the earlier years of the program. One of the manifestations of the success of the Sea Grant program has been the numbers of graduate students that have been introduced to marine sciences, educated, and who have conducted first rate research supported by the programs. This has spread marine science knowledge, research expertise and educational experience throughout society; especially at many educational institutions such as state colleges and smaller universities. Unfortunately, the potential of the innovative ideas and research capabilities of these scientists are not tapped effectively by the present Sea Grant funding mechanism and constrained budget. Despite these drawbacks, I strongly support your statement that funding for the program should not be reduced in order to fund the regional program outlined in S.2068.

The EPA Estuaries Program has been initiated in the past few years. The primary focus is on management related and regulatory issues. Some but not much of the efforts of these programs would pass muster as research. Other aspects of EPA's extramural research programs have decreased precipitously over the past several years as far as coastal and estuarine marine research is concerned. I visited EPA during the past two years and asked about marine research. The general impression that I received was an agency with a limited budget for any type of research and certainly an agency with a focus on shorter term regulatory related issues. I was told in so many words that fundamental research in coastal and estuarine areas was the responsibility of NSF and/or NOAA and Sea Grant. A similar visit to NOAA offices, other than Sea Grant, left me with the impression that budget constraints had reduced their program for extramural research to the point where it was ineffective in funding a broad ranging program of research to deal with well documented marine environmental quality issues.

The Department of Energy research program dealing with marine environmental quality issues has been decimated during the past several years because of funding cuts and department programmatic decisions. The Department of the Interior MMS Environmental Studies Program has experienced funding cuts recently and is mandated to research only those issues pertinent to OCS Leasing Activities.

The Office of Naval Research has a program of funding for fundamental ocean research, some of which pertains to marine environmental quality issues indirectly. However, those programs have been suffering from reduced funding in recent years. I could go on with extensive documentation of this depressing situation but it is obvious that funding for marine environmental quality research, especially in coastal and estuarine areas, has declined over the past several years. I do no more than confirm your statement to this effect in the Congressional Record Vol. 134 No. 13, February 17, 1988, p. 3.

One agency that does accept proposals for research in coastal and estuarine areas is the National Science Foundation. However, the wide ranging mandate of NSF for all aspects of Ocean Sciences and budget constraints effectively precludes significant funding in all but a few areas of coastal and nearshore environmental quality issues. Often, the review comments are "too applied; more appropriate to EPA or NOAA".

A factor that held back progress in coastal and estuarine research for several years was an inability of available technology and innovative research to deal with the complicated small scale time and space interactions that had to be addressed to make significant progress in coastal and estuarine research. This has not been a major factor during the past decade.

It is important to interject here a perspective on the sociology and demographics of the marine sciences research community. The numbers of marine scientists conducting open ocean deep sea research is small and limited compared to those trying to conduct coastal and estuarine research. Universities and institutions capable of mounting effective open ocean research ventures are limited to those with the resources to operate and maintain open ocean research vessels and requisite sophisticated and concomitantly expensive equipment. This has been changing slowly because of the shared ship resources and facilities in the UNOLS system that have opened deep sea research to scientists from all universities in the United States depending primarily on the excellence of the proposed research as determined by peer review. Despite this slow change, the community of scientists conducting open ocean research is small and concentrated in relatively few locations compared to the community of scientists conducting coastal and estuarine research. This latter community is spread among many large and small universities and colleges and non-profit organizations primarily in coastal areas around the United States. One result of the relative size of the populations of scientists is that the scientists conducting open ocean-deep sea research have an easier time arriving at a reasonable consensus of the priorities to be addressed.

Although, much of open ocean-deep sea research has important societal implications, generally the interactions with policy and politics are only in the national and international arenas. This is not the situation with coastal and estuarine research for which it is not uncommon to be faced with interactions with local, state, regional, national, and sometimes international politics, policy and management issues. Setting agendas for research within the latter set of circumstances is much more difficult and coastal and estuarine research, especially those projects dealing with environmental quality issues, lose out to open ocean-deep sea research. Another practical concern is that of proposal processing and review. If the majority of well qualified coastal and estuarine marine scientists at all the colleges and universities and non-profit organizations in coastal areas of the United States submitted proposals to the National Science Foundation, I submit that the review and proposal processing system as it is currently configured would be overwhelmed.

There is a very positive, encouraging aspect to marine research that should have important implications for fundamental research in nearshore coastal and estuarine areas. The National Science Foundation, NASA, and some sections within NOAA and to some extent other agencies are currently embarked on a very important and dynamic program of multidisciplinary, internationally cooperative research as part of the International Geosphere Biosphere Programs, known by the initials IGBP. This is an exciting, much needed enhanced coupling of earth sciences and life sciences research on a global basis from perspectives of both research programs and institutional arrangements. Details are contained in several documents available from the U.S. National Research Council, NASA, National Science Foundation, and International Council of Scientific Unions. I would be pleased to arrange for your subcommittee to receive these documents. Summarizing my own understanding of the overall goals of these programs the intent is to ramp up research and technology in the late 1980s and 1990s for sustained research, policy, and management efforts to enable human civilizations to live in much better harmony with our habitat as we enter the next millenium. This effort has been designated by several names; perhaps the most compelling is that stated by B. I. Edelson of NASA in an editorial in Science, Volume 227, January 1985, p. 367 as "Mission to Planet Earth".

The factors that make it a propitious time for such an endeavor are: 1) the widespread realization that human endeavors have altered significant, large portions of our habitat and life support systems on earth and have the potential for more dramatic changes in the future with largely inaccurately predicted consequences; 2) the emergence of significant "ex situ" (Remote) and "in situ" sensing capabilities and the prospect of marked near term future improvements for collecting data on appropriate time and space scales needed for significant advances in understanding local, regional, and global couplings of important geophysical, geochemical, and biological-ecological interactions; 3) vastly improved computer hardware and software capable of more efficient compilation, storage, and processing of data and numerical model computations;

4) the existence of at least two generations of students at undergraduate and graduate levels for whom there has been an exciting emphasis to think in holistic terms of geosciences-life sciences interactions; 5) a dramatic increase of public interest in broad principles of ecology and geosciences.

The initial ocean sciences contributions to the IGBP are two large scale research efforts; the World Ocean Circulation Experiment and the Global Ocean Flux Studies. The need for a continental shelf and nearshore-estuarine processes component to the programs has been recognized but not much action has been forthcoming due to budget constraints and the difficulty of achieving consensus and competing with open ocean sciences as I have outlined above. By these statements, I do not intend to imply that I do not support the World Ocean Circulation Experiment or the Global Ocean Flux Studies. I strongly support the general objectives of these programs. I am concerned that if this year's (fiscal 1988) reduced rate of growth in the ocean sciences budget at NSF is not reversed next year and for several years to come then the effective pursuit of the United States ocean sciences contribution to IGBP will be severely jeopardized and the essential continued funding of smaller group and independent investigator research projects so essential to a vital ocean sciences research effort will be severely, negatively impacted. Furthermore, larger scale continental shelf-nearshore-estuarine programs from the United States scientific community in conjunction with IGBP efforts capable of addressing many of the concerns outlined in the legislation before this subcommittee will be postponed at a critical time in their incubation.

I have emphasized the IGBP because I think that one prospect for achieving many of the goals of enhanced understanding of processes key to defining and resolving coastal and estuarine environmental quality problems in the long term is a coupling of a portion of your funding allocation to an enhancement of the nearshore-estuarine-coastal ocean part of the U.S. ocean sciences contribution to IGBP.

Overall, the general status of marine research programs and activities focused on coastal ocean and estuarine areas of the United States and marine environmental quality research in general is akin to transition from malnutrition to slow starvation. There is no lack of innovative ideas, nor is there a lack of capable, dedicated, enthusiastic researchers. There is a lack of funds.

Present Condition of the Marine Environment from an Environmental Quality Perspective and the Need to Expand and Strengthen Marine Research Programs. Research concerned with marine pollution problems made considerable progress in the late 1960s and the 1970s in identifying key problem areas and prospects for remedial action. While progress was significant, the nearly absolute ban on ocean dumping of wastes as mandated by Congress all but eliminated significant funding for research on open ocean pollution problems for several years. While open ocean pollution is not a specific focus of the bill before this subcommittee, I would be remiss in not raising the issue that research on open ocean-deep sea pollution problems in support of wise management of ocean disposal of wastes is woefully inadequate in the wake of the decisions to return to disposal of certain categories of wastes in the ocean. The same descriptors, woefully inadequate, apply to marine pollution research in nearshore and estuarine areas. This reflects a slow but steady erosion in total federal funding for marine pollution research and monitoring efforts as documented in "Report to the Congress on Ocean Pollution, Monitoring and Research, October 1985-September 1986" issued in December, 1987 by the National Ocean Service, NOAA.

Portions of the national efforts in marine research programs, particularly in coastal ocean and estuarine areas have declined to the point of approaching a crisis situation. The laudable and sometimes successful efforts of achieving a closer coupling and application of existing and newly generated knowledge of coastal and estuarine ecosystems and marine pollution problems with efforts at immediate problem solving and having a greater lay public involvement in this coupling process have come at the expense of generating critically needed new knowledge and understanding. The analogy that comes to mind is from economics; the utilization of all the interest from the existing principle and not adding to the principle while faced with demands for a greater yield of interest and in a time of inflation. Stated in an alternative manner, we are bankrupting our ability to effectively and judiciously deal with many present and future coastal ocean and estuarine pollution problems by the present overwhelming emphasis on applied research coupled with local management and regulatory issues. A more balanced approach is needed.

A few early successes in the 1970s have seemingly blinded several people responsible for coastal research, monitoring, and clean up activities to the large tasks ahead. If we are to reclaim some of our polluted coastal areas and reduce the risks for continued or increased adverse impacts on valuable living natural resources and the continuing concern for risks from toxic chemicals and biological agents returning to humans via the marine food web, then we must have a viable and significantly increased coastal and estuarine research effort.

Multi-state, Bio-geographic Regional Programs for Expanding and Strengthening Marine Research Programs.

Certainly many of the pressing research needs for coastal ocean and estuarine research can be addressed by a focus on regional research needs. For example, the question of cumulative effects of multiple ocean sewage outfalls or multiple river discharges of wastes containing toxic chemicals or nutrients to coastal areas of a region is one that should be addressed in a regional context rather than only on a case by case basis. Research on diseases and chemical contamination of migratory fish stocks has obvious regional connections. The issue of the health of much of the nation's fisheries has important regional components. The advantages of a regional approach are obvious as outlined in the legislation and background briefing material your staff has prepared. The main disadvantages are the problems associated with regional research efforts being held captive to differences in regulatory and management policies between states, the increased bureaucracy and management overhead costs required of a new program, and the fact that some problems will not be circumscribed by the boundaries between regions no matter how clever we are in choosing these boundaries. This latter problem could be overcome by allowing for region to region cooperation on relevant issues. I am also concerned about vital fundamental research being too closely subjected to the intricacies of within state, between state, and state-federal agency short term political interactions. My recent experience in interacting with and observing the EPA Estuaries and Bays Program has led me to the conclusion that some research that is conducted is governed by the least common denominator negotiated between agencies when interacting mandates and conflicting policies come head to head. This is a poor way to conduct scientific research.

Long-range Research Plans Addressing the Full Range of Research Activities in Identified Coastal Regions.

The requirement for long term planning is important. However, the time period specified, three years, is far too short for meaningful research programs to address many of the important marine environmental quality and coastal resources management problems. For example, environmental impact questions are often focused on the questions of long term (decades) impacts of multiple chronic low level pollutant discharges. Fisheries ecology questions and regional climatology issues are often addressed in five year to decade and multiple decade time frames.

Some requirements of the legislation relating to long term planning can be met by strengthening the existing strategic assessment division of NOAA and the EPA Estuarine Program. Cooperative exchange of information between these two entities should rapidly achieve several of the planning objectives. Several years ago NOAA, in response to the requirements of the marine Protection, Research and Sanctuaries Act convened regional workshops around the nation, with the exception of the Insular Pacific region to the best of my recollection, to address many of the requirements set forth in Section 405 of S.2068. At the very least, it was a start and my impression was that not much happened after the planning workshops because of a lack of funds. In fact, marine scientists have been called to planning workshops in response to provisions and requirements of the Marine Protection, Research and Sanctuaries Act several times in the last ten years. Important, workable plans from a scientific perspective have been set forth to address significant marine environmental quality problems and associated research needs. All too frequently, these plans and programs never achieve the required funding levels to be more than partially implemented. Yet, many of the same environmental quality problems and research needs in the coastal ocean and estuaries have persisted for the past ten years.

The Need for Providing General Information About Marine Conditions and Trends to the Public and Interested Parties.

I think that many aspects of the present situation are adequate and should be continued. Reports such as those issued by NOAA's National Ocean Service Office of Oceanography and Marine Assessment are very helpful and when transformed appropriately into articles for the layperson and explained in seminars and workshops for the general public and user groups are very effective means of communicating present conditions and future trends in coastal and estuarine areas. Much of the information compiled by this office of NOAA are already in formats that are easily transformed into regional assessments and projections. Workshops, symposia and citizens advisory committees as undertaken by the EPA's Estuaries Program and "Bays" Program are another effective means of communication between the public, policy and management sectors and research scientists. I do not recommend substantially increased levels of effort for these types of exercises except in regions where EPA's Estuaries and Bays Programs have not been active. I have a concern that is shared by a few of my colleagues in the scientific research community that some of these workshop type activities and symposia have stooped to a level approaching propaganda; i.e. spending more effort justifying the existence of the program than in communicating the real situation and relative contributions of the Estuaries and Bays Program vis a vis other activities in marine research in the geographic region.

Another concern that I bring to your attention I do so with some trepidation as I think there is a significant chance of this concern being misinterpreted. Thus, I will state first and explicitly that I believe that all research scientists have a responsibility to communicate effectively and interact with the public either directly via various media of information transfer or via their colleagues who are more comfortable in being active at the interfaces between scientific research and public policy and management, and public education. I was one of the research scientists who recommended several years ago for more effective, judicious use of existing knowledge for solving present day problems and for greater lay public involvement in the process. I am worried that the pendulum is swinging too far in that direction and away from a good balance with research pursued to generate new fundamental knowledge. Some of my colleagues in research are required to spend far too much effort in time consuming, interminable planning meetings; and with repeated detailed explanations of how their research will or will not meet immediate, short term problem solving needs. The vital freedom of pursuit of research unfettered by day to day, week to week, or month to month political machinations has been severely compromised in much of coastal ocean and estuarine research.

Coordination of Regional Marine Research with the Activities of Federal Agencies, Research Organizations, and Other Interested Parties.

I think several of the provisions of S.2068 are important to such activities especially the planning requirements in section 405. I recommend biannual regional workshops and symposia with separate sessions for policy and management issues, and scientific research reports on progress and planning and then combined sessions to effectively link ongoing and future research efforts with research needs. Several of the research activities will be of a duration of five to ten years and the biannual workshops and symposia will be a place for reporting progress and new knowledge and for recommending and implementing mid-course corrections if needed.

I think a strengthening of the Sea Grant Program with a regional component interactive with NOAA's Office of Oceanography and Resource Assessment could be an effective means of achieving several aspects of the coordination required in S.2068. A simultaneous strengthening of NSF's Ocean Sciences research with an allocation of funds specific to regional coastal ocean and estuarine research will contribute to achieving the underlying objectives of S.2068.

Suggestions for Improvement, Clarifications or Corrections to the Provisions of the Legislation in S.2068.

The underlying precepts of my suggestions are to provide adequate support for the highest quality research to achieve the objectives of obtaining significant new knowledge needed to address the nation's coastal ocean and estuarine research needs, particularly with respect to environmental quality concerns; and to achieve this support with minimum expenditure of funds for program management.

My concerns about the provisions for implementation of S.2068 as it now reads are as follows:

1) The managing agency is EPA. EPA is primarily a regulatory agency and its agenda has been very much focused on a wide variety of regulatory issues. Long range research, particularly in the coastal and estuarine areas has not been a strength of their extramural research program in recent years. There are a few notable exceptions such as the Marine Ecosystem Research Laboratory project at the Graduate School of Oceanography at the University of Rhode Island. The EPA's Estuaries and Bays Program has focused mostly on short term

management and regulatory issues and few of the projects would pass muster as true research no matter what the titles of the subsections of the Estuaries and Bays Management Programs would lead one to think. Too many management and regulatory components of coastal and estuarine programs, even though of vital importance, masquerade as research. This is not a blanket condemnation of the program, simply a point of view that I think EPA as it is presently configured and with its present philosophy and overwhelming needs for attention to other environmental quality issues is not the agency to head up the program envisioned in S.2068 as I interpret section 401. Some evidence of commitment by EPA to long-term extramural research concerned with marine environmental quality issues is needed prior to entrusting EPA with this program.

2) The program as set forth will require the establishment of a new bureaucracy with concomitant delays in start up and expenditure of more funds for management of the program than would be the case if the program could take advantage in part of aspects of existing program management structures and expertise.

3) There is a significant probability that research would be too strongly captive of local and regional political machinations and that the funds would be siphoned off to meet state agency shortfalls in funding for primarily individual state agency management and regulatory needs.

I recommend that you consider the following as modifications to the institutional arrangements in S.2068.

1) The Regional Coordination Boards be appointed by the Governors of member states of the region. Such appointments to include:

- a) Sea Grant University coordinators in the region. In the cases where the Sea Grant Programs are cooperative between states, additional appointments will be made to ensure one representative from Sea Grant Programs in each state in the region.
- b) Two appointments from each state of research scientists from academic institutions that are not Sea Grant Universities.
- c) Appointments equal in number to appointments in a) and b) from each state for representatives of non-profit public interest groups.
- d) Appointments equal in number to those in c) representing industry, businesses, and fishermen.
- e) One appointee from each state representing state agencies.

2) Regional Coordination Boards will also have liaison members from federal agencies with regulatory, management or research responsibilities in the region.

3) The Regional Coordination Boards convene workshops every two years with wide representation of the community of researchers, and regional marine resource users, regulators, managers to identify objectives for regional research with a ten year long-term plan set forth in two year increments. The plan as set forth will be forwarded for approval to the National Coordination Board which will function mainly as described in S.2068.

4) After approval of the regional plan, multistate, multiinstitutional, multidisciplinary research proposals will be received from research scientists in the region to address one or more of the goals and objectives of the regional plan. These will be forwarded to the National Board where national level peer review will be coordinated by the National Science Foundation's Ocean Sciences Division (with appropriate budget allocation for costs associated with the review process) on behalf of the National Board. The peer reviews will be summarized and forwarded, accompanied by anonymous verbatim copies of the peer reviews, to the National Board where each proposal will be ranked according to the quantity of the proposed science, appropriateness to the goals and objectives of the regions and qualifications and prior records of the principal investigators of the proposals.

These rankings and accompanying records of review will be forwarded to the Regional Boards for final selections of the projects to be funded including negotiations with one or more groups of P.I.'s to modify final proposals and contracts to achieve the best research programs to meet the goals and objectives of each region. This may involve negotiating cooperative, restructured research efforts between initially competing proposals.

5) The major workshops every two years will provide a forum for progress reports and mid-course corrections of the research efforts. Renewal proposals and new proposals would be accepted and reviewed every two years using the mechanisms described in (4).

The preceding institutional arrangements provide for: i) setting the agenda in the regions using wide representation of regional groups; ii) freedom for researchers to submit their ideas to achieve the stated objectives and goals; iii) peer review at the national level; iv) opportunity to minimize overlap with existing federal efforts by national level review and comment; v) final decision authority in the regions.

There should be explicit recognition in S.2068 that, in addition to physical sciences and natural sciences (e.g. biology, ecology) research, there is a need for social sciences, economics and policy components to research in regional marine sciences in order to deal effectively with coastal ocean and estuarine environmental quality issues.

There should be an explicit requirement to mesh appropriate aspects of the regional research with existing and planned IGBP efforts in ocean sciences as described earlier in my statement.

I have had only a short time to formulate my recommendations. Obviously, I am not as experienced with institutional arrangements as are you, the members of your committee, and your staff and thus there are probably many problems with them that I have not foreseen. Despite my critical comments in the preceding, I think that progress has been made over the past two decades in addressing coastal ocean and estuarine environmental quality needs. This progress came as a result not only of research in the scientific community, but because of dedicated efforts of agency program managers, federal, state and local officials, citizens action and advisory groups and a general interest in the public sector to improve the quality of coastal areas and to enhance wise management of our valuable coastal resources. Despite the difficulty of the problems facing us as outlined in S.2068, I am optimistic that we can accelerate the rate of progress in addressing and solving coastal ocean and estuarine environmental quality issues. There is no doubt in my mind that the scientific research community stands ready to continue working with you and others in this important endeavor.

Thank you for the opportunity to present this testimony. I will be pleased to respond to questions from you, your subcommittee and staff.

Testimony Presented to the United States Senate
Committee on Environment and Public Works
Subcommittee on Environmental Protection
Room 406, Dirksen Senate Office Building
April 28, 1988

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Dean, Graduate School of Oceanography
Vice Provost for Marine Affairs
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I want to preface my remarks by congratulating you Senator Mitchell, Senator Chafee, and the other cosponsors of the proposed legislation in the Marine Research Act of 1988 (S.2068) for your clear awareness of the problems facing our estuaries and coastal zone, and for your recognition of scientific research as a necessary and fundamental part of the effective protection of the marine environment.

While the United States leads the world in attempting to understand the oceanography of both the deep sea and our coastal waters, it must be clearly stated that our comprehension of these marine systems remains primitive. The only way to improve this understanding is through research, and by far the major source of funding for such research is the federal government. Our lack of knowledge is cause for concern, particularly with respect to estuaries and the coastal zone, where the pressure of increased population and the development of sophisticated technology are concentrated in an area that promises to become even more congested in the future.

Although we are placing unprecedented stress on the coastal zone, support for the basic research necessary to understand the effects of that stress has not been keeping pace. Fortunately we may now be seeing a resurgence of concern about oceanic processes, not only by scientists and policy makers, but by the enlightened public as well. To a large extent this has occurred because of our growing awareness that human activities can change and effect our ocean and atmosphere on a worldwide scale. The impact these human activities can have on such issues as climate and human health is substantial. For example, we are now beginning to understand the central role played by the ocean in global climate and in controlling the atmospheric conentration of carbon dioxide, a so-called greenhouse gas. We now know that increased burning of oil, coal, and other fuels can cause the atmospheric concentration of carbon dioxide to rise. These concentration changes can, in turn, lead to global climate change.

One only needs to read the newspaper to notice a similar heightened awareness of our increasingly exploited estuaries and coastal zone. There are almost daily articles about ocean dumping, about the conflicting interests of the oil industry and the fishing industry, about contaminated shellfish beds, and about beached whales and sick dolphins. Only this week we have seen reports that the nitrate in acid rain may affect the quality of our coastal marine waters. Despite this growing concern, we have not yet taken the decisive steps required to launch a major fundamental research program to investigate our coastal zone. To some extent this is because there is no federal agency with a clearcut mandate to focus on this region. In addition, it is quite difficult to study and understand the complex biological, chemical, and physical interactions and changes that occur when water flows from rivers and from sewage outfalls through estuaries onto the continental shelf. The questions we must address in the coastal region are scientifically challenging and intellectually demanding, and the answers are necessary for the future environmental, economic, aesthetic, and physical health of our nation.

In the 1970s the United States and other nations joined together in an interdisciplinary effort to probe the secrets of the open ocean. Through enhanced government support and a focusing of the nation's marine expertise on open ocean questions, this International Decade of Ocean Exploration provided a new dimension to our understanding of the deep sea. I believe we now need to move toward a Decade of Coastal Ocean Exploration for the 1990s. Your proposed legislation will provide an important first step in that direction.

This legislation clearly comes at an appropriate time. There are encouraging signs that other voices are also being raised in support of increased research in the coastal zone. The National Science Foundation (NSF), long the leading agency supporting basic research on the open ocean, is now developing new initiatives along the ocean's margins. This is in recognition of the fact that the coastal zone is critical to our society's long term well-being, and because the coastal zone provides an important interface between the continents and the open sea. It was also encouraging to note that the new Administrator of the National Oceanographic and Atmospheric Administration (NOAA), Dr. William Evans, focused his first public address on coastal oceanography and fisheries problems. He announced that he has begun mapping a detailed multi-disciplinary program that will address these areas. The Environmental Protection Agency's National Estuaries Program has also provided valuable support for the study of several specific estuaries, including Narragansett Bay in Rhode Island.

Have these slowly increasing public and governmental concerns about the coastal zone resulted in any general improvements in marine water quality? Or have the increasing population pressures and commercial and industrial developments, which focus pollutants into the narrow coastal zone, increased the degradation of our marine environment? Unfortunately, in many areas there is evidence that water quality is deteriorating. But perhaps even more disturbing is the fact that in many other areas we simply do not know with any scientific accuracy whether there has been improvement or degradation. The necessary measurement and long term monitoring programs that can give us a standard against which we can gauge water quality, and by which we can measure water quality changes, have simply not been available for most coastal regions. This can be illustrated by an example from our own Narragansett Bay in Rhode Island. The amounts of the nutrients phosphate and nitrogen that enter the waters under one acre of Narragansett Bay as a result of river and sewage flow are greater than the fertilizer applied to one acre of our most heavily fertilized agricultural land. And yet, because of a lack of historical data, we do not know how the concentrations of these nutrients have changed in Narragansett Bay over the last few decades. In particular, we do not know what the impact of an extensive program of new sewage treatment plant construction has been on the water quality of Narragansett Bay. As an another example of the problems we face, approximately 1900 tons of hydrocarbons enter Narragansett Bay each year, most of it from urban runoff and sewage. This number can perhaps best be appreciated by realizing that if these hydrocarbons were present as gasoline, they would provide enough fuel for a fleet of about 700 compact automobiles to drive around the earth at the equator!

It is interesting to note a few of the apparent inconsistencies in our societal attitudes to our coastal waters. At the same time that our population and technology are concentrating along the coast, and thus increasing the waste materials we deposit in the coastal ocean, individually we are hoping to protect our health by eating more fish caught in these waters. While we are preparing to lease sites on Georges Bank for oil and gas exploration, we are worrying about the endangered right whale which has a major feeding ground in the nearby Great South Channel. And while regulations to protect our coastal environment have proliferated, we often do not have adequate measurements or the fundamental scientific knowledge to support them.

Scientifically, the regional approach suggested in this legislation has much to offer. The broadscale interactions among the different inputs of chemical materials, the complex circulation patterns of the water, and the extensive biological diversity in the coastal zone can be addressed more realistically on a regional scale, since this gives us the opportunity to study complete marine ecosystems. However, these ecosystems are so complex that no one institution has the expertise required to understand them. The regional approach will provide a considerably expanded pool of scientists whose expertise can be brought to bear on these issues. Multi-state projects can easily lead to complex administrative and coordination problems if not handled carefully, however. Overcoordination and a complex bureaucracy must be avoided if first rate scientific results are expected. In particular, duplication of administrative structures and of cooperative programs already in place should not be allowed.

I believe that carefully developed plans and objectives for such regional programs are vital to their success. However, there are a number of potential and real dangers in developing plans as far as ten years in the future - the relevant societal and scientific problems can change quickly, particularly in a discipline such as marine pollution. Instrumentation and measuring capabilities evolve rapidly, enabling new dimensions of scientific problems to be addressed. Thus long range plans must be very flexible and must allow for the inevitable changes in scientific and societal objectives as well as new technological developments.

Informing the public and policy makers about the state of the coastal marine environment, its problems, and the changing strategies for its future protection are important objectives of this program. To keep administrative burdens to a minimum, existing channels of communication should be used. One well tested avenue is through the Marine Advisory Service of the National Sea Grant Program.

The federal agency selected for administering and funding the research intended by this legislation will determine to a large extent the degree of success of the program. Since no single agency is now charged with coordinating research in the coastal zone, the choice of the appropriate agency is not obvious. The basic goal of this proposed program should be to obtain the very best and relevant science for the dollar. This is consistent with minimizing the bureaucracy and utilizing existing administrative structures.

I believe that this program should be administered by some combination of the National Science Foundation and the National Oceanic and Atmospheric Administration's National Sea Grant Program can best accomplish this goal. The respected and time-tested peer review system of the NSF, coupled with its long history of support of fundamental marine research and its increasing interest in coastal problems, will ensure high-quality science. The very successful and visible Sea Grant Program will provide a proven administrative structure while ensuring that we have a finger on the pulse of regional issues.

For twenty years the Sea Grant Program has been administering research in multi-state regions, involving institutions other than Sea Grant Colleges, and developing overall long-range plans. For example, the policy of the National Sea Grant Office is that all of the Sea Grant Colleges develop three to five-year research plans. The National Sea Grant Office itself also develops regular long-range planning and priority setting documents. There are numerous multi-state research projects in Sea Grant. One example from our own campus includes cooperative research in experimental coastal lagoons. Under a Rhode Island Sea Grant Program scientists from other institutions have been funded to work cooperatively with our researchers. At present we have scientists from New Hampshire, New Jersey, Maryland, Virginia and North Carolina included in a study of the effects of nitrate-enriched groundwater on shallow coastal ecosystems. There is also no problem with a Sea Grant College funding research at other institutions. Sea Grant has a very broad mandate and can award funds to non-sea Grant academic institutions, state agencies, private consulting firms, or citizens groups. Our own program at the University of Rhode Island currently has projects including a local consulting firm and the Newport (Rhode Island) Historical Society.

I believe that cooperative, multi-institutional research can effectively be administered by existing regional Sea Grant Councils, which consist of state Sea Grant directors. For example, there is a Northeast Sea Grant Director's group, consisting of the directors of the Sea Grant Programs of all coastal states from Maine through New York. This group meets regularly to discuss common concerns and to coordinate research efforts. Recent examples of such regional coordination include studies of the "brown tide" and "eel grass wasting disease", which are problems along our northeast coastline. This regional Sea Grant group also meets annually with the Northeast Center of the NOAA National Maine Fisheries Service to coordinate projects of mutual interest, thereby taking advantage of the vast expertise which exists within our federal agencies. Similar regional groups exist along the southeast, Gulf, and Pacific coasts.

As I envision it, the grants proposed in this legislation would be specifically for cooperative, regional, estuarine and coastal marine research, and they would have a clear identity separate from normal Sea Grant funding. Each regional Sea Grant Council would develop and submit a three-year research plan. The plan would be developed with advisory input from state and federal agencies and from a regional advisory panel consisting of some members of each state's Sea Grant Advisory Group. This would provide the valuable and necessary input from marine industry and from concerned environmental groups.

Both the long-range plans and the annual funding requests would be subject to review by the National Science Foundation. Part of that review could include comments from the federal agencies listed in the current version of the legislation as the Marine Research Coordinating Board. Comments could also be sought from the National Sea Grant Advisory Committee. This approach would have a number of advantages:

1) It would take advantage of a proven existing regional research structure and network.

2) It would take advantage of Sea Grant's established link with marine industry, state and local environmental regulatory agencies and citizens environmental groups.

3) It would achieve rapid results. My guess is that the plan could be developed and submitted within three to six months after the appropriation of funds. All of the administrative structures and personnel are in place to get

the scientists working in short order.

4) Mechanisms for peer review and fiscal oversight are in place.

5) It would be cost effective. Relatively little money would have to be spent on administrative infrastructure or operating costs.

6) It would take advantage of the long established ability of Sea Grant and NSF to develop multi-disciplinary research projects.

Finally, a specific comment on the terminology used in the present legislation - I recommend that the terms of reference be simplified. I find the words estuarine, coastal, marine, nearshore, offshore environments, etc., all used in various ways. I would suggest using "estuarine and coastal marine" in all cases. That would clearly include estuaries, wetlands, lagoons, bays, gulfs, bights, and the continental shelf.

In conclusion, I again want to congratulate the cosponsors of this legislation which is so important for the future of our estuaries and coastal marine environment. The marine sciences community is eagerly looking forward to the many opportunities this legislation would provide to advance significantly our understanding and our protection of the nation's estuarine and coastal marine waters. I thank you for this opportunity to share my views with you today.

II

100TH CONGRESS
2D SESSION

S. 2068

To amend the Marine Protection, Research and Sanctuaries Act to protect marine and near-shore coastal waters through establishment of regional marine research centers.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 17 (legislative day, FEBRUARY 15), 1988

Mr. MITCHELL (for himself, Mr. CHAFEE, Mr. BENTSEN, Mr. JOHNSTON, Mr. INOUYE, Mr. MOYNIHAN, Mr. SANFORD, Mr. COHEN, Mr. LAUTENBERG, Mr. BRADLEY, Mr. D'AMATO, Mr. MATSUNAGA, Mr. WARNER, Mr. SARBANES, Ms. MIKULSKI, and Mr. GRAHAM) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

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A BILL

To amend the Marine Protection, Research and Sanctuaries Act to protect marine and near-shore coastal waters through establishment of regional marine research centers.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

SECTION 1. (a) TITLE.—This Act may be cited as the "Marine Research Act of 1988".

(b) TABLE OF CONTENTS.—

Sec. 401 Findings.
Sec. 402 Purpose.

Sec. 403 Definitions.
Sec. 404 General authority.
Sec. 405 Regional research plans.
Sec. 406 Research, support, and equipment grants.
Sec. 407 Monitoring and regional assessment.
Sec. 408 Marine Research Coordination Board.
Sec. 409 Authorizations.

AMENDMENTS TO THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

SEC. 2. AMENDMENT.—The Marine Protection, Research and Sanctuaries Act is amended by adding at the end thereof the following new title:

"TITLE IV—REGIONAL MARINE RESEARCH CENTERS

"FINDINGS

"SEC. 401. FINDINGS.—The Congress finds that—

"(1) the Nation's marine and near-shore, coastal waters are a resource of tremendous value;

"(2) marine waters, including estuaries, are vital and productive natural ecosystems;

"(3) marine and near-shore coastal waters support commercial fisheries with an estimated value of over $5,500,000,000 per year, and recreational fisheries with an estimated value of over $7,500,000,000 per year;

"(4) marine and near-shore coastal waters support extensive recreational activities and related support services;

"(5) maintenance and protection of the environmental quality of the Nation's marine and near-shore costal waters is essential to the commerical and recreational activities they support;

"(6) recent studies and reports provide evidence of growing threats to the environmental quality and ecological integrity of marine and near-shore coastal waters;

"(7) a report by the Congressional Office of Technology Assessment found that the overall health of coastal waters is declining or threatened;

"(8) studies by the Environmental Protection Agency and the National Oceanic and Atmospheric Administration have identified unexpectedly high levels of contaminants in a number of coastal areas;

"(9) expanded and improved research and monitoring of marine and estuarine ecosystems is needed to gain a more complete understanding of these ecosystems, how they function naturally, and how human activities may be affecting them;

"(10) ongoing changes in world climate will alter regional weather and oceanic processes in ways which will affect the distribution and abundance of marine organisms;

"(11) there is a need to develop marine research programs which take a comprehensive approach to marine ecosystems in the various coastal and marine regions of the Nation;

"(12) there is a need to improve the extent of coordination among various marine research activities at the regional level and provide for long-range planning of research and related projects;

"(13) significant improvements in marine research can be accomplished through expansion and support of research at the regional level;

"(14) there is a need for sufficient and sustained Federal support for research and monitoring to protect the Nation's marine and coastal environment;

"(15) there is a need for comprehensive and periodic reports to the Congress on conditions and trends in marine environmental quality, research needs, and response programs; and

"(16) the results of marine and near-shore research are valuable to developing and implementing marine and coastal environmental protection programs at the Federal, State, regional, and local levels.

"PURPOSE

"SEC. 402. PURPOSE.—The purposes of this title are to—

"(1) establish regional marine research centers to protect the Nation's marine environment;

"(2) provide sufficient and sustained funding for these regional centers to develop comprehensive, long-range research plans, and coordinate and support marine research and related activities;

"(3) establish within the Federal Government the capability to provide effective oversight of regional marine research; and

"(4) provide for periodic, comprehensive reports to Congress concerning conditions, trends, research needs, and response programs in the Nation's marine environment.

"DEFINITIONS

"SEC. 403. DEFINITIONS.—For purposes of this title—

"(1) the term 'Board' means the Marine Research Coordination Board established pursuant to section 408 of this title;

"(2) the term 'region' means a Marine Research Region designated in section 404(f) of this title;

"(3) the term 'Federal agency' means any department, agency, or other instrumentality of the Federal Government, any independent agency or establishment of the Federal Government including any Government corporation;

"(4) the term 'local government' means any city, town, borough, county, parish, district, or other public body which is a political subdivision of a State and which is created pursuant to State law; and

"(5) the term 'nonprofit organization' means any organization, association, or institution described in section 501(c)(3) of the Internal Revenue Code of 1954 which is exempt from taxation pursuant to the provisions of section 501(a) of such Code.

"REGIONAL MARINE RESEARCH CENTERS

"SEC. 404. (a) GENERAL AUTHORITY.—There is authorized to be established within each region, as defined under subsection (f), a regional marine research center.

"(b) PURPOSES.—Regional marine research centers established pursuant to this section are intended to—

"(1) set overall goals for an integrated, long-term program of research and monitoring of marine and estaurine environmental quality in the region;

"(2) develop comprehensive, long-range plans which identify the specific needs and priorities of research and monitoring activities and projects;

"(3) assure coordination of research among State agencies and other organizations involved in marine research in the region;

"(4) monitor environmental quality conditions of marine and near-shore coastal waters and assess the impacts of proposed activities in these waters;

"(5) provide a forum for review and comment on research plans from affected user and interest groups, such as commercial fishermen, other marine industries, and environmental organizations; and

"(6) provide a forum for coordinating research among research institutions, with other regions and with neighboring countries; and

"(7) make public reports on the environmental quality conditions in the region; analyze and interpret research data and information at the request of the relevant State and local agencies in the region for their application in environmental protection programs; and make such scientific recommendations to local, State, and Federal agencies on design of effective programs to address identified problems as may be necessary.

"(c) AUTHORITIES.—Each regional marine research center shall be authorized to—

"(1) support basic and applied research, investigations, monitoring, and assessment activities through its member organizations and agencies in the estuarine, near-shore coastal, and offshore environments of the region;

"(2) cooperate with Federal agencies, with States and with local government entities, interstate and regional agencies, other public agencies and authorities, nonprofit institutions and organizations, or other persons, in the preparation and support of marine research in the region;

"(3) enter into contracts, cooperative agreements or grants to member organizations, and to other State and local governmental entities, other public agencies or institutions, and nonprofit institutions and organizations for purposes of carrying out the provisions of this Act;

"(4) collect and make available through publications and other appropriate means, the results of, and other information pertaining to, the research conducted in the region;

"(5) support development of effective and practical methods and techniques for the detection and assessment of contamination in the marine environment;

"(6) hire staff and equip them as may be necessary to carry out the provisions of this Act, including the ownership and operation of research vessels and construction of necessary vessel-related support structures;

"(7) call conferences on regional marine research and assessment issues, giving opportunity for interested persons to be heard and present papers at such conferences;

"(8) support, in consultation with the Department of State, joint marine research projects with foreign nations;

"(9) utilize facilities and personnel of existing Federal agencies, including scientific laboratories and research facilities;

"(10) accept, and for all general purposes of this Act, utilize funds from other sources, including but not limited to State and local funds, university funds, and donations;

"(11) accept donations of equipment if such equipment benefits regional marine research programs, with appropriate tax deductions available; and

"(12) acquire secret processes, inventions, patent applications, patents, licenses, and property rights, by purchase, license, lease, or donation.

"(d) AREAS OF INVESTIGATION.—In carrying out the purposes and authorities of this section, regional research centers may support or assist research, investigations, studies, surveys, or demonstrations with respect to, but not limited to—

"(1) baseline assessment of marine environmental quality, including chemical, physical, and biological indicators of environmental quality;

"(2) basic oceanographic and biological conditions and processes;

"(3) effects or potential effects of contaminants, including nutrients, toxic chemicals and heavy metals, on the environment, including marine and aquatic organisms;

"(4) inventory of pollutant sources and pollutant discharges into the coastal environment;

"(5) transport, dispersion, transformation, and fate and effect of contaminants in the marine environment;

"(6) marine and estuarine habitat assessment, protection, and restoration;

"(7) methods and techniques for modeling environmental quality conditions and trends;

"(8) methods and techniques for sampling of water, sediment, marine and aquatic organisms, and demonstration of such methods and techniques;

"(9) the effects on human health of contaminants or combinations of contaminants at various levels, whether natural or anthropogenic, that are found in the environment;

"(10) assessment of potential effects of major coastal and offshore development projects in the region;

"(11) assessment and monitoring of the effects of climate change on marine resources in the region; and

"(12) analysis and interpretation of research data for the benefit of State and local environmental protection and resource management agencies in the region.

"(e) CREATION OF REGIONAL CENTERS.—(1) The Governors of a majority of the States in a region, as defined in subsection (f), may develop and submit for approval to the Marine Research Coordination Board a combined, interstate proposal for a Regional Marine Research Center.

"(2) Proposals for establishment of a Regional Marine Research Center shall—

"(A) identify the goals and objectives of the Center;

"(B) identify the research organizations that will participate in the Center, including State agencies, research laboratories and organizations, academic institutions, and others;

"(C) identify the organizational structure and authority of the Center, including establishment of a Board of Directors, creation of an Executive Director position, and provision for professional staff and management support;

"(D) identify the research capabilities and experience of the member organizations and how such experience will be coordinated and maintained; and

"(E) provide for a Research Advisory Group to include representatives from affected user and interest groups, including the commercial fishing industry, other marine industries, and environmental organizations, that will advise the Board of Directors in the conduct of authorized activities.

"(3) Any proposal developed pursuant to subsection (1) shall be submitted to the Marine Research Coordination Board for review and approval.

"(4) Within ninety days of receipt of a proposal, the Board shall hold a public hearing in the region to hear comments on the proposal.

"(5) Within one hundred and eighty days after receipt of a proposal, the Board shall approve or disapprove the proposal on consideration of the following criteria—

"(A) inclusion as members of the Center, or other provision or mechanism for full coordination and cooperation with, relevant State agencies, marine research organizations or institutes, and universities with marine programs in the region;

"(B) demonstrated capability in sufficient disciplines to successfully mount a multidisciplinary research program;

"(C) sufficient resources, including laboratory, library, computer, and support facilities;

"(D) a commitment from the member institutions to the support and continuation of an effective marine research program; and

"(E) establishment of an Advisory Group pursuant to paragraph (2)(E), and commitment to adequate procedures for effective consultation with such group.

"(6) In the case of disapproval of a proposal, the Board shall notify the Governors of the submitting States in writing, stating in detail the revisions or modifications necessary to obtain approval of the proposal. The Governors of the interested States may, not later than ninety days following such notification, submit such revisions and modifications as they deem appropriate. The Board shall approve or disapprove the revised proposal within ninety days of receipt.

"(7) Representatives of the Environmental Protection ~~Agency~~ and the National Oceanic and Atmospheric Administration, designated by the senior administrative official, shall serve as ex officio members of each regional center.

"(f) Marine Research Regions.—For purposes of this Act, marine research regions are defined as follows:

"(1) Gulf of Maine region, comprised of the marine and near-shore coastal waters off the States of Maine, New Hampshire, and Massachusetts (north of Cape Cod);

"(2) greater New York bight region, from south of Cape Cod to Cape May, comprised of the marine and near-shore coastal waters off the States of Massachusetts, Rhode Island, Connecticut, New York, and New Jersey;

"(3) mid-Atlantic region, from Cape May, New Jersey, to Cape Lookout, comprised of the marine and near-shore coastal waters off the States of New Jersey, Delaware, Maryland, Virginia, and North Carolina;

"(4) South Atlantic bight region, from Cape Lookout to the Florida Keys, comprised of the marine and near-shore coastal waters off the States of North Carolina, South Carolina, Georgia, and Florida (Atlantic coast);

"(5) tropical region, comprised of the marine and near-shore coastal waters off Puerto Rico and the United States Virgin Islands (and to provide for broader international research coordination, representatives from the nations of the Caribbean region may serve as ex officio members of this region);

"(6) Gulf of Mexico region, comprised of the marine and near-shore coastal waters off the States of Florida (Gulf coast), Alabama, Mississippi, Louisiana, and Texas;

"(7) Southern California bight region, comprised of the marine and near-shore coastal waters off the State of California from Point Conception south;

"(8) North Pacific region, from Point Conception to the Canadian border, comprised of the marine and near-shore coastal waters off the States of California, Oregon, and Washington;

"(9) Gulf of Alaska and Arctic Seas region, comprised of the marine and near-shore coastal waters off the State of Alaska; and

"(10) insular Pacific region, comprised of the marine and near-shore coastal waters off the State of Hawaii, Guam, American Samoa, and the Northern Mariana Islands.

"REGIONAL RESEARCH PLANS

"SEC. 405. (a) REGIONAL RESEARCH PLANS.—Each Regional Marine Research Center, approved under section 404, shall develop a three-year marine research plan for the region.

"(b) CONTENTS OF PLAN.—Such marine research plan shall include—

"(1) an overview of the environmental quality conditions in the near-shore coastal and marine waters of the region and expected treads in these conditions;

"(2) a description of the research needs, goals, and priorities in the region over the upcoming ten-year period;

"(3) a comprehensive inventory of all federally-funded marine research and monitoring activities expected to be conducted during the three-year term of the research plan, including, but not limited to, projects funded under—

"(A) this Act;

"(B) the National Sea Grant Program;

"(C) sections 319 and 320 of the Federal Water Pollution Control Act;

"(D) the Fish and Wildlife Act of 1956; and

"(E) the Magnuson Fishery Conservation and Management Act of 1976.

"(4) discussion of the mechanism for coordination with the activities identified in paragraph (3) to avoid duplication and assure effective use of resources;

"(5) description of research projects, areas, and programs anticipated to be assisted with funds provided under section 406 of this Act in the three-year period covered by the plan, including—

"(A) identification of the responsible organization, laboratory(s), or principal investigator(s);

"(B) estimated budget and equipment needs;

"(C) schedule of major activities;

"(D) final products of the project; and

"(E) relationship to research needs and priorities identified in paragraph (2) and to other projects identified in paragraph (3).

"(6) an inventory of supplies and equipment used commonly for research projects in the region.

"(c) PLAN REVIEW AND APPROVAL.—(1) The research plan shall be submitted to the Marine Research Coordination Board for review and approval.

"(2) The Board shall approve or disapprove the research plan within ninety days of receipt.

"(3) In review of research plans, the Board shall consider the degree to which the plan addresses the elements identified in subsection (b) of this section.

"(4) In the case of disapproval of a research plan, the Board shall notify the Board of Directors of the Regional Research Center in writing, stating in detail the revisions or modifications necessary to obtain approval of the proposal. The Center shall, not later than ninety days after such notification, submit such revisions and modifications as they deem appropriate. The Board shall approve or disapprove the revised proposal within ninety days of receipt.

"(d) PLAN REVISION.—The research plan shall be updated at least every three years and resubmitted to the Board for review and approval under this section.

"RESEARCH, SUPPORT, AND EQUIPMENT GRANTS

"SEC. 406. (a) SUPPORT GRANTS.—(1) A regional marine research center for which a proposal has been approved pursuant to section 404, may submit to the Board an application for a support grant on an annual basis.

"(2) The application may provide for funding of basic functions of the Research Center including—

"(A) cost of facilities, offices, and related equipment;

"(B) salaries and expenses of staff and other personnel services;

"(C) reasonable maintenance costs of equipment, including vessels, as determined by the Board; and

"(D) other overhead costs including costs of publications, development of research plans, operation of the Board of Directors, and conduct of scientific and related meetings and seminars.

"(3) The application shall be for a period of a fiscal year and shall be in such form as may be required by the Board.

"(4) In no case may the total Federal grant under this subsection be in excess of $500,000 per fiscal year.

"(5) The Board shall approve an application which is consistent with the requirements of this subsection within 90 days of receipt.

"(b) Research Grants.—(1) A regional marine research center for which a research plan has been approved pursuant to section 405 may submit to the Board an application for implementation of that research plan on an annual basis.

"(2) The research grant application shall provide funding, to the extent available under section 409(a)(2)(A)(ii), to member organizations and agencies for research projects identified in the research plan, as needed and appropriate, to be conducted during that fiscal year.

"(3) The Board shall review grant applications and shall fund the application within ninety days of receipt of the application if the application is consistent with the approved research plan.

"(4) The Research Advisory Group of the research center shall have an opportunity to review and comment on the annual grant application and the Board shall consider the comments of the Advisory Group in reviewing grant applications.

"(c) Equipment Support.—(1) Any research center with an approved research plan pursuant to section 405 of this act may submit to the Board an application to purchase equipment necessary for the research provided for in the approved research plan and funded under subsection (b), to the extent funds are available under section 409(a)(2)(B).

"(2) Equipment eligible for support under this section includes, but is not limited to—

"(A) monitoring and sampling equipment;

"(B) computer hardware or software;

"(C) scientific measurement and analytic equipment; and

"(D) necessary vessels and related support craft.

"(3) In review and approval of applications under paragraph (2)(D), the Board shall evaluate the following—

"(A) a clearly demonstrated need for the equipment in the region to support identified research projects;

"(B) adequate provision for maintenance and full utilization of the equipment, including loaning of equipment to organizations participating in another marine research center; and

"(C) consultation with the Federal Fleet Coordinating Council and the University Oceanographic Laboratory System (UNOLS) to determine the need for vessels or support craft.

"(4) Regional centers shall report annually to the Board on the status and disposition of any equipment funded under this subsection and shall give notice of ninety days prior to any sale of such equipment.

"(d) **Reporting.**—Any Regional Marine Research Center that receives a grant under this section shall report to the board not later than eighteen months after award of the grant on accomplishments made pursuant to this subsection. Such report shall include narrative summaries and technical data in such form as the Board may require. Such report shall be provided to the Governor of each participating State and to the Research Advisory Group for the region.

"(e) **Management.**—For administrative purposes, the grant funds and grant award process pursuant to this section shall be managed by the Environmental Protection Agency.

"MONITORING AND REGIONAL ASSESSMENT

"Sec. 407. (a) **Monitoring and Assessment.**—Each Regional Marine Research Center established in accordance with section 404 and receiving funds pursuant to sections 406 and 409 of this Act shall, consistent with its research plan developed under section 405—

"(1) support baseline monitoring of fundamental marine environmental conditions in the region, in accordance with criteria, measurement standards, and quality assurance techniques required by the Board; and

"(2) prepare periodic assessments of the status of marine environmental quality and resources.

"(b) Regional Assessment Report.—(1) The Regional Assessment Report mandated under this section shall—

"(A) provide an overview of environmental quality in the region using such information as is obtained pursuant to paragraph (A) of subsection (a);

"(B) describe trends in natural resource and environmental quality conditions;

"(C) summarize the activities and research projects of the center and identify future needed projects; and

"(D) provide recommendations for improvements in the design or implementation of Federal, State, or local programs for the protection of environmental quality in the region.

"(2) A draft of the Regional Assessment Report shall be reviewed by the Research Advisory Group for their comments and input before final submission.

"(3) The Regional Assessment Report shall be drafted in nontechnical style and made available to the public, as well as to local, State, and Federal regulatory and management agencies. The Regional Assessment Report shall be submitted to the Governors of each State in the region.

"(4) Reports under this subsection shall be submitted to the Board on a schedule to be determined by the Board. To the extent practicable, the Board shall provide for reports beginning three years after the date of establishment of each center and every three years thereafter.

"MARINE RESEARCH COORDINATION BOARD

"SEC. 408. (a) ESTABLISHMENT OF MARINE RESEARCH COORDINATION BOARD.—(1) There is authorized to be established a Marine Research Coordination Board to manage and coordinate the efforts of the regional marine research centers authorized under section 404 of this Act.

"(2) The members of the Board shall be representatives of the following Federal agencies, designated by the senior administrative official of each agency—

"(A) the Environmental Protection Agency,

"(B) the National Oceanic and Atmospheric Administration,

"(C) the National Science Foundation,

"(D) the United States Fish and Wildlife Service,

"(E) the Minerals Management Service,

"(F) the United States Army Corps of Engineers,

"(G) the United States Navy, and

"(H) the National Academy of Science.

"(3) The executive director of each Regional Marine Research Center, approved pursuant to section 404(e), or the director's official designee, also shall serve as full members of the Board.

"(4) The representative of the Environmental Protection Agency shall serve as Chair of the Board.

"(5) The Board shall organize its internal structure and functions as it deems necessary to best fulfill its responsibilities.

"(b) FUNCTIONS AND AUTHORITIES.—(1) The Board shall be responsible for the following—

"(A) review and approval of proposals for Regional Marine Research Centers, including conducting a public hearing in the region, in accordance with the provisions of section 404;

"(B) review and approval of the three-year research plans submitted by Regional Marine Research Centers, in accordance with section 405; and

"(C) approval of grant applications from the Regional Marine Research Centers, in accordance with section 406.

"(2) The Board is authorized to—

"(A) hire professional and support staff to carry out the provisions of this section;

"(B) hire an Executive Director at the Senior Executive Service (SES) level;

"(C) expend funds authorized under subsection (d) as required to carry out the provisions of this section; and

"(D) make grants to the Regional Marine Research Centers, pursuant to sections 406 and 409.

"(c) REPORT TO CONGRESS.—(1) The Board shall make periodic reports to Congress on the health of the Nation's near-shore coastal and marine waters, and on activities and accomplishments of the Regional Marine Research Centers.

"(2) Reports under this subsection shall be made within one hundred and eighty days of the receipt of reports required under section 407(b) of this Act.

"(d) FUNDING.—The activities of the Board shall be supported with funds available under section 409 of this Act.

"AUTHORIZATIONS

"SEC. 409. AUTHORIZATIONS.—(a)(1) For the purpose of carrying out the activities authorized by sections 404, 405, 406, and 407 of this Act there are authorized to be appropriated $29,500,000 for each of the fiscal years ending September 30, 1989, 1990, 1991, 1992, and 1993.

"(2) Such funds shall be allocated as follows—

"(A) grants to regional marine research centers established pursuant to section 404: *Provided,* That—

"(i) such research center has submitted a proposal which has been approved pursuant to section 404 of this Act;

"(ii) no annual grant to such center shall exceed $3,000,000; and in the case of the Tropical Region, no annual grant to such center shall exceed $1,500,000.

"(B) grants for purchase of equipment under section 406: *Provided*, That such sums are not allotted for use under subparagraph (A).

"(b) For the purpose of carrying out the activities authorized by section 408 of this Act there are authorized to be appropriated $1,000,000 for each of the fiscal years ending September 30, 1989, 1990, 1991, 1992, and 1993.".

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